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ORIGINAL ARTICLES.

THE USE OF THYROID.[1]

BY WILLIAM E. MOSELEY, M.D.,
OF BALTIMORE, MD.

AFTER hearing the very favorable report upon the use of thyroid in cases of bleeding fibroid, made by Dr. Polk in a paper read before the Baltimore Gynecological and Obstetrical Society last October, I determined to put all suitable patients who came under my care upon a like treatment and note the results. Believing that a study of the physiologic action of the drug would be of interest to this Society I requested Dr. E. L. Whitney, Lecturer on Clinical Pathology in the Baltimore Medical College, to make some investigations for me. This he kindly did, and I take great pleasure in presenting the report of his results as a part of this paper.

The cases which I have had under observation are only five in number and are as follows:

CASE I.—Mrs. C. S., aged forty-seven years, entered the Maryland General Hospital January 5, 1898. Her mother died of tuberculosis; otherwise her family history was negative, as was also the patient's early history. Menstruation began at twelve years, regular every four weeks, very free and accompanied by considerable pain until after the birth of her first and only child, which was born twenty-three years ago. Between 1880 and 1898 she suffered from a number of severe hemorrhages, which occurred independent of the menstrual period. During the past year menstruation has been irregular but excessive in amount.

Her uterus was found to be pretty regularly enlarged, the probe entering to a distance of seven inches. The endometrium bled freely on the touch of the probe. I curetted this uterus for the sake of having the endometrium examined microscopically, and put the patient on thyroid, 1 grain after each meal, to be increased 1 grain daily until 15 grains daily were taken. The pathologist's diagnosis from the scrapings was glandular hypertrophy with edema and congestion.

Since the operation the flow has been much reduced in amount and when the patient was last seen it was perfectly normal. The woman left the hospital on February 9th and was directed to continue the thyroid in doses of 9 grains daily. There have been no heart, kidney, or stomach symptoms.

CASE II.—H. M., female, aged thirty-three years, single, colored, entered the Maryland General Hospital January 5, 1898. One child born fifteen years ago, natural labor. No abortions. Family and early personal history negative. Menstruation began at seventeen, regular, lasting four or five days, no marked pain. During the preceding three months she had had a very free flow every two or three weeks and lasting eight or ten days, accompanied by severe pain. In November she had a profuse flow lasting two weeks, and was much debilitated on account of loss of blood.

Examination showed the uterus to be decidedly enlarged by intramural fibroids, but no measurements were taken. The patient was put upon thyroid, 3 grains daily, to be increased 1 grain each day until 15 grains daily were taken. She left the hospital February 16th and was directed to take 9 grains of thyroid daily and report every two weeks. There have been no heart, kidney, or stomach symptoms. The menstrual flow has been regular and normal, and the patient has improved much in general health.

CASE III.—E. C., female, single, white, aged fifty years, entered the Maryland General Hospital November 2, 1897. Family and early personal history negative. Menstrual flow free but fairly normal until five years ago, since which time the flow had been very excessive and accompanied by considerable pain in the pelvis and back. There had also been a free intermenstrual glairy leucorrhea. The patient's condition was one of extreme anemia, the mucous membranes appearing practically bloodless. The lungs were negative. There was a loud blowing systolic murmur, loudest over the base of the heart, and a loud bruit in both sides of the neck and also in the lower portion of the aorta. The uterus was symmetrically enlarged, forming a smooth, rather elastic tumor, 21 cm. between perpendiculars in its transverse and vertical diameters. The patient was ordered thyroid, 3 grains daily, to be increased 1 grain each day until 15 grains daily were taken. She was also ordered arsenic and reduced iron.

On December 14th the tumor measured 18 cm. in its transverse and 19 cm. in its vertical diameter. The patient had taken on flesh. There was a decided return of color to the mucous membranes and marked improvement in strength and in heart symptoms. The thyroid was continued in doses of 15 grains daily until February 11th, when the patient left the hospital, being directed to take 9 grains of the drug daily and to report from time to time. On May 18th I measured the tumor and found it 14 cm. in transverse, and 16 cm. in vertical diameter, a diminution of 7 and 5 cm. respectively. The bruit had entirely disappeared from the carotid arteries and there was but a slight soft murmur transmitted through the tumor from the aorta.

[1] Read at the Twenty-third Annual Meeting of the American Gynecological Society, held at Boston, May 24, 25, and 26, 1898.

The thyroid at no time caused any disturbance of the heart, kidneys, or stomach, and after beginning the use of the drug, the menstrual flow was excessive on only one occasion, and for the past few months has been very slight in amount.

CASE IV.—Mrs. H. E. C., white, aged forty-six years, first entered my private hospital four years ago. Her family and early personal history were negative. Menstruation had been normal to within three years. Since 1891 the patient without any known cause had suffered from very severe menorrhagia, the flow lasting upward of two weeks out of every four. This condition had been ascribed to "change of life" and had been practically neglected by her family physician. On examination I made out nothing more than a moderate enlargement of the uterus and an endometrium that bled profusely on the introduction of a probe. I curetted the uterus thoroughly and put her upon tonics. For about three months there was relief from the menorrhagia, but later the flow became as free and as persistent as ever.

Two years ago she again came to me and I curetted her a second time, and during the operation made out a small fibroid in the anterior wall of the uterus. The scrapings from both of these operations were examined microscopically and pronounced perfectly benign. Last January she came to me a third time. Although her general health was better than it had been for several years and her extreme anemia had disappeared to a considerable extent, probably owing to persistent tonic treatment, she was still losing a large amount of blood at each period, the flow lasting between one and two weeks, forcing her to keep her bed. I put her on thyroid, beginning with 3 grains daily and increasing 1 grain daily. The drug in her case was not well borne. As soon as she went beyond 6 grains a day her ankles and legs would swell, albumin would appear in her urine, her heart action would become rapid and irregular, and her appetite would disappear. A discontinuance of the drug for a few days would bring about a return to a normal condition. While the thyroid was being used in 4- to 6-grain doses daily, the excessive bleeding was held in check and the patient's general health and strength improved. She was under observation six weeks, and since her return home has in an irregular manner continued the use of a small amount of the drug, with the result that the excessive flow has been held fairly well in check.

CASE V.—Mrs. R. W., white, aged thirty-five years, widow, no children. In January, 1895, I opened her abdomen on account of enlarged tubes, the result of a prolonged inflammatory condition. I found the intestines agglutinated together and the pelvic cavity completely walled off by lymph. As she took the anesthetic very badly, I simply washed out the abdomen and closed the incision. She did perfectly well and during the following few months gained sixty pounds in weight. During the latter part of 1897, however, she complained of discomfort in the left iliac region together with rather excessive menstrual flow.

She entered my private hospital on November 9th, there being present a very excessive menstrual discharge. On November 15th examination under ether showed an elastic enlargement in the line of the left tube, and after curetting her thoroughly I drained the tube through the vagina, the fluid apparently being a bloody serum. At this operation I made out a fibroid thickening in the upper portion of the left side of the uterus. The scrapings were reported benign. The two succeeding menstrual flows were excessive in amount and I ordered thyroid to be taken as in the preceding cases. This patient could take 6 grains daily for a limited time without bad results, but even that quantity if persisted in caused loss of appetite and marked dyspeptic symptoms, together with a very rapid and irregular action of the heart, and she had to limit herself to 4 grains daily. This, however, was sufficient to keep the excessive loss of blood in check. The menstrual flow became normal in amount and character and has so remained.

From these five cases I came to the following conclusions: (1) That, whereas some patients can take comparatively large doses of thyroid with impunity, others are injuriously affected by small amounts, and that, in using it, one should begin with a minimum dose, say 3 grains daily, increasing the amount very slowly and watching its effect upon the heart and kidneys carefully; (2) that in cases of bleeding fibroids, thyroid has a very marked influence in checking the excessive loss of blood, and that in certain cases at least its use is followed by a diminution in the size of the growth; (3) that its use, in doses appropriate to the individual, is followed by improvement in the general health, this being probably due to the cessation of excessive loss of blood.

Dr. Whitney's report is as follows:

By our present methods of blood examination it is impossible to demonstrate any alteration in the blood which will explain the changes taking place in the organism under the influence of thyroid. The only change, as the analyses show, which can be demonstrated is a moderate increase in the percentage of small mononuclear cells with a corresponding decrease in the percentage of polymorphonuclear neutrophiles. There might be, it is true, an increase in the oxidation equivalent of the blood or an increase in the volume of blood, but neither can be determined by any of our methods with any degree of exactness. In the cases where an apparent anemia is cured by the action of thyroid, the action may be better explained by considering the cure as simply the result of a local action upon some physical condition underlying the anemia (Case I.). In Case II., the patient suffering from mental trouble could not be induced to eat or exercise. Under thyroid the mental and physical conditions both improved. As

a consequence the blood condition also improved. In Case III. the condition was one of intense anemia from bleeding fibroids. Under treatment with thyroid, the bleeding ceased, necessarily the condition of the blood improved, as it probably would have done under any other treatment which would have stopped the hemorrhage, making the blood secondary to the change in the fibroid. (See Case II., of Dr. Richardson's blood-count.)

Now with regard to its effects upon metabolism. All the cases which I have studied during the past two years, some superficially, others carefully, show a considerable decrease in the amount of nitrogen and salts eliminated in the urine. This fact, taken in connection with the undoubted decrease in weight in persons suffering from obesity, renders it positive that the decrease in weight must be due to the increase in the metabolism of fats in the body. Carbohydrates are stored up in the body in only moderate amounts at any time, the increase in weight being due to an increase in the amount of fats (hydrocarbons) in the body. This narrows the increase in metabolism to an increase in the metabolism of fats. Now by oxidation of fats the products formed are CO_2 and H_2O, both of them eliminated principally by the lungs, and both difficult to estimate except by very elaborate apparatus. Whatever histologic connection there may be between myofibromata of the uterus and connective-tissue cells of areolar and adipose tissue I must leave to the histologist and gynecologist to discover. I think the relation must be nearer than is commonly supposed.

The following reports of the blood examination in Cases I. and II. were furnished me by Dr. Richardson of Mount Hope, and I am sure they are correct. The results agree in the main with those I have previously obtained and with statements contained in the literature on the subject of thyroid medication:

CASE I.

Before treatment:
- Erythrocytes 4,528,000
- Leucocytes 8500

Differential count:
- Small mononuclear ..... 17.6 per cent.
- Large " ..... 8.4 "
- Eosinophiles ..... 1.8 "
- Multinuclear ..... 72.2 "

Specific Gravity 1053
Hemoglobin ..... 75 per cent.
No basophilic perinuclear granules observed with dahlia.

After one week's treatment, patient taking 5 grains three times daily:
- Erythrocytes 4,835,000
- Leucocytes 8000

Differential count:
- Small mononuclear ..... 27.9 per cent.
- Large " ..... 9.6 "
- Eosinophiles ..... 1.2 "
- Multinuclear ..... 62.3 "

Specific Gravity 1053
Hemoglobin ..... 75 per cent.
No basophilic perinuclear granules with dahlia.

CASE II.

Before treatment:
- Erythrocytes 3,648,000
- Leucocytes 9400

Differential count:
- Small mononuclear ..... 10.0 per cent.
- Large " ..... 6.8 "
- Eosinophiles ..... 1.0 "
- Polynuclear ..... 81.2 "

Specific Gravity 1045
Hemoglobin ..... 45 per cent.
Perinuclear basophilic granules ..... 0.5 "

After three-weeks' treatment, patient taking 2½ grains three times daily:
- Erythrocytes 4,320,000
- Leucocytes 8000

Differential count:
- Small mononuclear ..... 21.2 per cent.
- Large " ..... 7.4 "
- Eosinophiles ..... 2.1 "
- Polynuclear ..... 69.3 "

Specific Gravity 1054
Hemoglobin ..... 78 per cent.
Perinuclear basophilic granules ..... 0.15 "

From published reports in connection with typhoid treatment it has been found that changes occur in blood as follows: (1) a slight increase in the number of mononuclear-cells; (2) a corresponding decrease in the percentage of the polymorphonuclear neutrophiles; (3) an increase in the oxygenating power of the blood.

The urine shows, in general terms: (1) a decrease in the amount of nitrogen eliminated; (2) a decrease in all nitrogenous constituents; (3) a decrease in the amount of mineral matters; (4) albuminuria if too large doses are used.

Bodily conditions. In obesity: (1) a decrease in weight; (2) no corresponding decrease in strength; (3) taken in connection with urinary analysis it indicates that the increase in metabolism must fall on hydrocarbons and carbohydrates, the increased metabolism and change of which acts as a saving principle to the proteids of the body.

From Berlin, where Dr. Whitney at present is working with Professor Thierfelder, he writes as follows regarding thyroid:

"In accordance with my promise, I have been trying to look up the thyroid treatment and its effects more thoroughly, but so far have been unable to find any satisfactory report of its results. The effects upon metabolism may be briefly stated as follows: (1) Upon the nitrogenous metabolism and elimination its influence is stated by some to remain normal; by others, including Chittenden, the elimination is stated to be slightly but uniformly increased, the diet remaining the same. Those observers who have found the daily elimination of nitrogen the same or decreased have possibly failed to

take into account the injurious effect of large doses of thyroid upon the appetite and digestion, with consequent decrease in the amount of food (and nitrogen) ingested. The increase in the amount of nitrogen eliminated remains, however, always slight. (2) The effect upon general metabolism is shown by the decrease in weight which follows the prolonged administration of thyroid, especially if in excessive doses. As there is not a corresponding increase in the amount of nitrogen eliminated, this loss must come chiefly from the non-nitrogenous elements of the body, that is, fats or the carbohydrates. This is apparently proven in the following ways: (*a*) There is a marked increase in the amount of CO_2 eliminated by the body, showing increased oxidation of the carbonaceous materials of the body. (*b*) The loss of weight is most pronounced in those suffering from obesity, leading to its use as an 'anti-fat' remedy. (*c*) In mild cases of diabetes mellitus the sugar may be made to diminish or disappear entirely under the use of thyroid. These effects may be explained by one or both of the following hypotheses: (1) It may exert a specific stimulating effect upon the areolar tissues of which adipose tissue forms only a modification, due to the deposition of fats. (2) It may increase oxidation by increasing the oxidizing power of the blood. Its demonstrable effects upon the blood are limited, usually showing a slight increase in the number of mononuclear leucocytes, other changes in the blood, found at times, being explicable by changes in the organism, the alteration in blood constitution being secondary, as for example, the increase in hemoglobin and red corpuscles after administration of thyroid in bleeding fibroids.

"The explanation of its action upon fibroids must be hypothetical only. Analyses of dried fibroids show them to contain about fifteen per cent. of nitrogen (average) and only 1.5 per cent. of fats (matter soluble in boiling ether). Its action may be that stated above, that is, stimulation of the tissue composing the fibroid with resultant absorption, or by an increase in the oxidizing power of the blood, with absorption of the fibroid as a secondary effect."

SACROILIAC DISEASE (TUBERCULAR).

BY L. L. MCARTHUR, M.D.,
OF CHICAGO.

SINCE the mechanism of joint and bone infections has been cleared up by the experimental work of the bacteriologist and pathologist, there remains but little divergence of opinion as to the possibility of invasion of any of the body-joints by infective elements, the frequency of invasion being almost directly proportional to the activities of, and forces acting on, the given joint. Omitting direct macroscopic infective embolism, it has become almost a surgical axiom that there must be two etiologic factors in the induction of a joint inflammation: first, the infective elements, such as pus-microbes, gonococcus, tubercle, rheumatism, staphylococcus, *et id genus omne*, and, second, trauma. By trauma we are to understand not merely direct or indirect violence alone (though this is one of the most frequent forms), but likewise cold, wet, excessive use, pressure, and even chemical irritations, which may determine the localization at any one point of the infective elements.

How? It should now be well known and remembered (1) that when bacteria in moderate number gain access to the circulation, whether artificially or by disease, they are immediately captured, enveloped, swallowed by the leucocytes, except when present in overwhelming numbers, and carried to the liver, spleen, and other emunctory organs, where they are slowly disintegrated, the products of the disintegration being stored up in such large quantities as often to multiply many times the size of these organs. (2) That this fact is true of the leucocyte; while the leucocyte remains in the blood-vessels it is not killed by such ingestion of micro-organisms. (3) That *ubi irritatio ibi fluxus* is as true of the white as well as the red blood-corpuscle. (4) Should this irritation or trauma occur to an organism, some of whose leucocytes chanced to be charged with pathogenic bacteria, the determination of leucocytes to the irritated part, some laden with bacteria, follows with certainty. (5) Let the leucocyte, so handicapped, however, wander out from the blood current, and it dies through the lack of the protective antitoxin in the flowing blood streams; immediately the contained bacteria begin to reproduce, the inflammatory war is on, more leucocytes called by their chemotactic sense of present toxins, more deaths through lack of protective serum, more exudate. This, true in the case of pus-microbes, holds similarly true with our other common pathogenic organisms.

With this understanding of the mechanism of infection of a joint, we can easily conceive how processes so common in the great joints of the body, exposed as they are to so many forms of trauma, may with diminished frequency occur in those less exposed, less mobile, less vascular articulations or semi-joints, the sacroiliacs. We are all familiar with the class-room experiment of injecting into the jugular circulation of one or two dogs staphylococcus cultures, and then fracturing the femur in each or bruising the knee. The one with the pus-microbes will, with unerring certainty, have a localized sup-

puration, the other not. Schüller has done the same with tubercle bacilli.

Since it is the specific organism which determines the infection, and the trauma the localization, it is as conceivable that we may have a tubercular, suppurative, gonorrheal, rheumatic or puerperal infection of the joints in question as well as those of other parts of the body, the relative frequency being determined by the active or passive parts played in the motions of the body. While it is true that these joints differ somewhat anatomically from the others, the better anatomists agree as to the presence of (1) a synovial membrane, (2) a capsular ligament, (3) cartilage, (4) ligaments, and (5) a smooth articular surface. We are not surprised, therefore, to find in the literature cases described as belonging to each of the quoted types of disease affecting this joint, as they do the other body articulations. I have made this digression for the purpose of showing the fallacy of the position taken by some, that on anatomical grounds those inflammations, whose localization depends upon the existence of a synovial membrane, cannot occur here: namely, gonorrheal, rheumatic, syphilitic, or puerperal; secondly, because others may never have seen any.

My aim in selecting this subject for our discussion has not been to present to you a classical *résumé*; this has already been accomplished in a masterly way by Van Hook, who reviews the entire literature to 1889 with fifty-eight well-recorded cases and adds one by himself, but to present what practical points I have gleaned from personal experience with five advanced and a sixth possibly incipient case (all tubercular), as well as to recall your attention to a disease which must be thought of in making a diagnosis in every suspected hip-joint disease, sciatica or low-lying Pott's, and which, once seen, will probably remain indelibly fixed in the memory.

When the bones constituting this joint are examined the smooth auricular surface of the ilium attracts attention, and the roughened larger area for the attachment of the strongest ligament in the body. The pelvis being held in the position it occupies when erect shows that the anterior is really, in life, the inferior surface, and the converse for the posterior. The proximity of the first, second, and third sacral nerves of the sacral canal, the internal iliac vessels, and the rectum in front once recalled will make clear many of the symptoms, render plain the sequelæ, and suggest the surgical treatment. Occurring in all periods of life, Velpeau shows that 37½ per cent. occur between 20 and 25 years, 22 per cent. below 15 years, and before 5 and after 60 very rarely.

Symptoms.—Chauvel believes cavalry officers most frequently affected. Males much oftener than females. Erichsen, from a clinical study, considers the chief symptoms as (1) pain, (2) lameness, (3) changed attitude and length, (4) tumefaction, and (5) abscess.

Pain.—Consider the joint, its functions, its relations, and it is easily understood that pain will be an early, persistent, and prominent symptom. Like any other joint, pain will be in the immediate neighborhood, in lower lumbar regions, in buttocks; and, since the sacral nerves, the obturator, genitocrural, and the anterior crural nerves pass in close relation to the joints anteriorly, any irritation to their trunks will be referred to their terminal distribution; hence, the anterior and posterior thigh areas the knee, and the external genitals are complained of. It will be increased by supporting the weight of the trunk; hence, felt either standing or sitting; made worse by jarring in that position, relieved by lying on the back, but aggravated by lying on the affected side.

The surgeon takes advantage of this knowledge as one of his chief aids to diagnosis by mechanically driving the two joints' surfaces together by counter-pressure over the ilia when the most constant symptom of pain is made manifest. Pain is sometimes wholly absent on pressure over the joint posteriorly, probably in the early cases of affections involving only the anterior portion of the joint.

The rectum lying in front of the inflamed joint will attract the patient's attention by pain, with constipated bowel movements, just prior to evacuation by pressure on the anterior joint, *i.e.*, as the fecal mass passes the bulging made by the inflammatory pelvic exudate. This was a prominent symptom in Cases II. and IV., about to be reported, and suggests the immense importance of a rectal exploration in every case of doubtful hip, iliac, or sciatic disease.

Posture.—Intuitively the patient shifts the weight of the body to the opposite side, as Sayre thinks, to make extension by the weight of the leg, takes short steps to avoid motion at this joint, sets the heel and toe down flat on the affected side, and through efforts to somewhat fix the sacroiliac joint may adduct or abduct the limb to an extent sufficient to make an *apparent* shortening or lengthening, which may misdirect one's thoughts to the hip-joint unless on guard, through the knowledge that this may be likewise induced by sacroiliac disease. By a similar effect on the pelvic veins to that occurring in milk-leg, or pelvic neoplasm, there may be marked edema of the lower extremity. The lack of use of the muscles here in the efforts of the patient to prevent pain soon induces an atrophy on that side, the gluteal region may become flattened, and limping is always pres-

ent. The persistence of the tilting of the pelvis may induce a lateral compensatory curvature above.

Tuberculosis of other joints occurs in one of two ways: by primary synovial tuberculosis, or by bone tuberculosis and extension to the joint, never beginning in the other joint structures, and this holds equally true of the joint under consideration. Therefore, when the synovial invasion occurs there is first what has been called the "moist" variety, of Velpeau, and when extension by the rarefying tuberculous osteitis to the joint, the "dry" or granulating variety. Now, as the synovial portion of the articulation lies at the anterior, or, if we consider the erect posture, the inferior quadrant, it is easily seen how the larger proportion of patients have the cold abscesses appear intrapelvicly, at the point of greatest dependence, where they may burrow in the several manners hereafter mentioned: (1) Forward into the rectum; (2) outward along the pyriformis muscle and sacral plexus behind the great trochanter; (3) downward along the rectum to the ischiorectal fossa; (4) forward and outward along the psoas muscle beneath Poupart's ligament; or (5) upward over the crest of the ilium.

In a certain proportion of cases a fluctuating tumor forms over the posterior aspect of the joint first, and may open directly backward, or burrow up along the erector spinæ muscle to the lumbar region. More frequently this tumor is secondary to the anterior abscess formation and only betokens the spreading of the disease. All but two of the patients whose cases are to be reported here came to me through the hospitals and, therefore, were not seen in the very early stage of the disease, and I cannot therefore add any testimony to the statements made by the authorities that in the very early stages of the disease there is usually to be found a thickening and tumefaction over the dorsal line of the joint, but I should think this to be necessarily true, at least in those in whom, later, the cold abscesses show posteriorly.

Methods of Opening.—When the abscess empties into the rectum (often the first objective symptom noted), the patient calls attention to the purulent discharge, and often is soon seized with the classic symptoms of sepsis—chill, fever, and sweating, as a result of the mixed infection of the tubercular abscess cavity by the intestinal bacteria, and then first calls the physician. Such a sequence followed, too, the spontaneous or surgical opening of such an abscess prior to very recent years, for in the absence of the strictest antiseptic technic a mixed infection takes place similar to that which formerly occurred in opening a psoas abscess, therefore inducing the preantiseptic surgeons to avoid opening, or when opening to resort to the valvular opening with the vain hope of preventing any air or other external vicious elements from gaining access. Ridlon, in writing on this subject, takes the unique position that in this situation the abscess is to be opened, while in the psoas it is not.

Every ischiorectal abscess, especially when of the cold or painless variety, should be carefully examined prior to its opening in order to detect its possible sacroiliac origin. If of such origin, in my opinion it would be better to first excise the joint and drain posteriorly before a mixed infection occurs, unavoidable with an opening near the anal margin.

With the abscesses opened spontaneously or surgically and fistulæ established, whether near the trochanter, under Poupart's ligament, or behind the joint, the direction taken by the probe will be *toward* the sacroiliac junction, *away* from the hip, and though it fail to touch denuded bone, will lead so near to it as to justify the suspicion of the disease at that location. In some cases of mixed infection the spinal canal has been invaded; thus Ashhurst has seen a fatal case by an extension to the sacral canal and cord, as has also Satterthwaite.

Localized elevation of temperature over the joint has been recommended by Holmes, and utilized by Sayre, as a diagnostic aid. When next an opportunity offers I shall endeavor to demonstrate the rarefying osteitis by the X-ray photograph and localize the same, thus gaining information both as to the extent and the position of the focus.

Diagnosis.—Stedman has arranged a convenient differential diagnosis table as follows:

SACROILIAC DISEASE.

1. Rare.
2. Hip motions free.
3. Young adult males.
4. Spine not rigid though often held stiff.
5. Limb apparently elongated and not infrequently abducted.
6. Characteristic position.
7. Cautious passive movement at hip, painless.
8. Pain usually localized.
9. When sinus, probe goes direction sacroiliac joint.

HIP-JOINT DISEASE.

1. Common.
2. Restricted.
3. Childhood both sexes.
4. Spine freely movable.
5. Character varies.
6. No characteristic position; varies.
7. All painful.
8. In hip, knee, or thigh.
9. To joint of hip.

POTT'S DISEASE.

1. Not common so low down.
2. Free, except when psoas is contracted.
3. Not rare in adults.
4. Spine rigid.
5. Thigh flexed.
6. When verticals destroy forward inclination of body.
7. Painless.
8. Pain in back.
9. Probing no aid as seeks distant outlets.

Sciatica usually occurs in much older people, and there is no characteristic position, and no deformity except slight flexure. No reflex muscular spasm. Gant says the anterior superior spine of the affected

side is lower than the opposite one. Ashhurst says the prognosis is usually fatal though slow.

Treatment.—Having never seen any positive cases in the very early stages of the disease I have had no experience with the methods of rest, of extension, Benjamin-Lee girdle around the pelvis for limiting motion at the joint, or the Hutchinson high shoe on the well foot, with crutches, and a lead sole on the affected side, but theoretically would prefer that rest of the joint, however obtained, which would permit the moving about of the patient in preference to steady confinement in bed with anteroposterior leverage hip-splints. In the present light of bacteriology the external cauterizations and moxæ of olden times have been abandoned, but I would not, therefore, presume to deny their occasional efficacy, their acute inflammatory congestions perhaps acting as does a severe trauma. It is a matter of common experience that tubercular joints follow much more frequently the mild than the severe injuries. The intelligent surgeon will, of course, do what is possible toward rendering the constitutional condition normal, and in the absence of extension of the process to the tissues external to the joint would be justified in trying the simpler lines of treatment. When, however, an abscess exists, I believe it is of the utmost importance to the patient to have it opened *secundem artem*, never here allowing Nature to take its course, since, whether it opens in the rectum or opens spontaneously externally, there comes the dreaded mixed infection, which in the past led the surgeons to take so gloomy a view of any operative interference, and furnished statistics of thirty-eight abscess cases and only three recoveries (Van Hook). We now appreciate the danger to be a pus-infection, and with reasonable care can avoid this danger if the case be seen early enough. Even having once started, we can many times check the process by prompt radical measures.

The dearth of any systematic plans of attacking this joint when one comes to search the literature is most surprising, some of quite recent date failing to refer to surgery at all (Stedman). Van Hook has offered the most practically systematic plan dependent upon the location of the abscess. "If posterior, incise over the joint; if anterior, chisel away the posterior inferior spine of the ilium, and reach the anterior surface of the joint by following through the artificial notch." Study of the joint led me to approach the articular surface from without, after loosening the gluteal attachments with the periosteum, by chiseling away an auricular fragment, corresponding in approximate size to the joint within, directly through the ilium. The localization of this area is particularly easy if the posterior margin of the great sciatic notch is taken as a guide, and beginning posteriorly, piece after piece is chipped off to the depth of the joint. The whole anterior surface can soon be exposed, and then as much more as may be found by the softened condition of the tissues to be necessary, while at the same time access is gained to any abscess lying anterior to the joint which can be properly drained. At first blush one might think such an incision would result in the disintegration of the pelvic ring, but if it is remembered that the strongest ligaments of the body hold these structures in contact, and that the articular surface is designed more for permission of motion than for supporting weight, and that clinical experience shows that radical removal of the diseased structures does not cripple while it does cure what heretofore has been considered a tedious but hopeless ailment, one need not hesitate to act. Terillon has twice trephined the ilium for drainage of pelvic abscesses over necrotic bone. In speaking of this subject, König states that Fischer and Rinnée have trephined for drainage, but it does not appear clear whether he means at the joint or through the ilium. He has done so himself. With the articulated pelvis in hand it will be seen that this method I have recommended enables one to expose the whole joint, if necessary, and enables one to reach the anterior surface without injuring important structures, while the supra-articular route of Van Hook does not even then comprehend any access to the bony joint. All that one can glean from literature, with the exception mentioned, is that the abscesses were opened and the joint curetted, but this is not so easily accomplished as written, and I believe I have described the only practicable plan of safe approach to the joint.

CASE I.—Child, aged twelve years, a patient in the Michael Reese Hospital. Preexisting lumbar curvature, Pott's disease. Entered the hospital with an abscess anterior and posterior to the sacroiliac joint. Opening of the posterior abscess showed fecal complication, and exploration showed complete perforation of the sacroiliac joint. Patient hectic, with general amyloid degeneration. Death after six weeks.

CASE II.—P. W., aged fifteen years, referred to me by Dr. Ernst Schmidt. Abscess over crest of the ilium communicating with an abscess anterior to the joint. Exploration of the exterior abscess confirmed the diagnosis of sacroiliac disease. Curetting of the joint and draining of the abscess permitted the boy to return home with a small fistulous tract discharging a small quantity of pus posteriorly. Death six weeks after return home. Uremic convulsions, general amyloid disease.

CASE III.—L. Y., girl, aged fifteen years; referred to me by Dr. Frank Billings. Had had operation of curettement of the joint at the age of thirteen, by

Dr. J. E. Owens. Wound required fourteen months to heal. Second attack, abscess anterior to the joint burst into the rectum. First noticed pain at stool; then had strong septic fever. Posterior abscess was tympanitic. Contents offensive; fever 104° F. Operation of curettement and chiseling out of diseased bone. Wound eighteen months in healing. Weight before operation 87 pounds, at present 122.

CASE IV.—G. X., male, aged eighteen years, of small size; Jewish. Admitted to Michael Reese Hospital in September, 1897. Thinks trouble was caused by driving a delivery wagon for several months. Six months prior to admission he began to have pain in the knee and thigh, and then became lame. Four months after onset of the symptoms he went to the County Hospital. There an incision for suspected ischiorectal abscess was made. No result. Then a large pelvic abscess was drained by an incision through the rectum. Fever then was severe. The boy did not improve and later came to the Michael Reese Hospital. The tumor could be felt over the right iliac joint anteriorly. Slight temperature. Operation of chiseling away an ear-shaped mass of bone, exposing sacroiliac joint, Dr. D. F. Coolidge assisting. Patient discharged, improved, but the wound not completely healed, with instructions for dressings to be made at the dispensary. He returned on May 21, 1898, with pulmonary tuberculosis and a small sinus.

CASE V.—Male, aged thirty-two years. St. Luke's Hospital. Tumor posterior to the joint with a sinus leading to the lower segment of the joint. Chiseling and curetting operation, packing, with recovery.

CASE VI.—Referred to me by Dr. Ridlon for early operation. No tumefaction. Pain indistinct, classical, and negative. Some lateral curvature. Advised the constricting fixation girdle.

THE ETIOLOGY OF YELLOW FEVER.[1]

BY FREDERICK G. NOVY, M.D.,
OF ANN ARBOR, MICH.;
JUNIOR PROFESSOR OF HYGIENE AND PHYSIOLOGICAL CHEMISTRY IN THE UNIVERSITY OF MICHIGAN.

(Continued from page 331.)

III. RELATION OF THE SANARELLI BACILLUS TO THE COLON-TYPHOID GROUP.

In his first memoir Sanarelli calls attention to the fact that the growth of his bacillus on gelatin might at times resemble that of the colon bacillus, and thus give rise to confusion. The marked pleomorphism of the colon colonies, their chestnut-brown color and the characteristic appearance of the colon surface colony would serve to distinguish the colon bacillus from that of Sanarelli. This undoubtedly is true when these organisms are perfectly typical. The colon bacillus, however, can be readily modified when grown for several generations on very alkaline bouillon (40 to 50 c.c. normal NaOH per liter), or when grown on hard fifteen per cent. gelatin. The surface colonies then become circular and raised, but are more opaque then those of Sanarelli.

The Sanarelli organism, in some of its characteristics, resembles the colon bacillus, but on the whole it shows closer affinity to the typhoid bacillus. This relationship can best be seen from the following summary of its cultural properties:

Like the colon bacillus, it gives rise to an acid reaction in litmus-colored media. In special litmus media, where the Eberth bacillus does not change the reaction, the Sanarelli bacillus behaves in like manner. It also gives rise to gas production in glucose and lactose media. It differs from the colon bacillus, but resembles the typhoid bacillus in the following properties:

1. The indol reaction is not given, or but very faintly.
2. Milk is not coagulated.
3. The growth on potato is moist and invisible.
4. It produces no growth in Uschinsky's medium. In this respect it agreed with seven different cultures of the typhoid bacillus. On the other hand, six different colons and the Havelburg bacillus gave excellent growths. This medium is, therefore, as useful as either of the preceding in differentiating typhoid from colon bacteria.
5. It produces no growth in Elsner's medium.
6. Cultures in bouillon of diverse reactions remain cloudy almost indefinitely, and on the surface scarcely any ring or film forms. Occasionally a broken film does form on the surface. The colon bacilli form a ring on the surface, and a more or less broken film; the growth soon settles and leaves a perfectly clear transparent liquid. The bouillon culture of only two out of six different typhoid bacilli became perfectly clear on standing, the remainder were undistinguishable from parallel cultures of the Sanarelli bacillus.
7. In bouillon containing 10 c.c. of normal HCl. per liter, added to the neutralized medium, it gives a very slight growth, and in bouillon containing 20 c.c. of the acid per liter there is no growth whatsoever. The growth of the typhoid bacillus is inhibited in like manner, whereas the colon and Havelburg bacilli will grow quite well in such acid bouillon. In bouillon containing 50 c.c. of normal NaOH per liter the Sanarelli and typhoid bacilli can scarcely develop, whereas the colon bacillus gives a fair growth.
8. On agar containing 10 c.c. of normal HCl. per liter, added to the neutralized medium, the growth at first is very slight with Sanarelli and typhoid bacilli. In about five days it becomes thick, dry,

[1] Read before the Michigan State Medical Society, Detroit, May 6, 1898.

white, and lustrous. No growth develops on agar containing 20 c.c. of the acid. The colon and Havelburg bacilli give good thick, white growth on such agar.

9. On agar containing 20 or 30 c.c. of normal NaOH per liter, added to the neutralized medium, the Sanarelli and typhoid bacilli yield at 39° C. thin transparent growths, indistinguishable one from another. On the other hand, the colon and Havelburg bacilli give on the same media thicker, more opaque growths. The appearance of the Sanarelli bacillus on agar at 16° C. has already been described.

10. On gelatin plates at 16° to 18° C. the Sanarelli and typhoid colonies develop very slowly, and at the end of forty-eight to sixty hours, to the naked eye, they have the same appearance and size. On the other hand, the colon and Havelburg bacilli grow much more rapidly; hence, the colonies are several times larger and opaque, yellowish in appearance. Under these conditions the colon, Emmerich, and Havelburg bacilli form typical crater-like spreading-surface colonies, 2 to 3 mm. in diameter, absolutely indistinguishable. The deep colonies of the colon and typhoid bacteria are circular or roundish, slightly granular, and yellowish in color, whereas the deep colonies of the Sanarelli bacillus are circular, coarsely granular, and dark or black in appearance. The temperature and consistency of the gelatin has much to do with the form of the colonies, as shown in the first part of this paper. The Sanarelli bacillus resembles the typhoid bacillus in the slowness of growth on gelatin, but not to any extent in the form of the colonies.

11. On Stoddart's medium the Sanarelli and typhoid bacilli form an exceedingly thin, almost perfectly transparent growth, which in twenty-four hours covers the entire surface of the medium in a Petri dish. The motile colon bacilli do not, as a rule, diffuse as rapidly, and the growth is considerably thicker and slightly opaque. The non-motile colon, Emmerich, and Havelburg bacilli, merely form large thick colonies in the center of the dish.

It is evident from the preceding that the Sanarelli bacillus is closely related to the typhoid bacillus. Numerous comparisons of these organisms, made under most varied conditions, have shown such marked similarity that one cannot escape the conclusion that the Sanarelli bacillus belongs to the group of typhoid-like bacilli. There is not, however, that perfect similarity, such as is seen between the Havelburg and certain colon bacilli. It is interesting to note that from the first post-mortem made by Sanarelli a pseudo-typhoid bacillus was isolated. From a case of acute yellow atrophy of the liver, Vincent (*Compt. Rend. Soc. Biol.*, p. 462, 1893) isolated a colon bacillus in large numbers, which resembled the typhoid bacillus. It was extremely motile, scarcely fermented lactose, gave no indol reaction, and was said to be moderately pathogenic. The gelatin colonies were discrete and translucid.

In addition to the facts presented above, it may be well to state that, morphologically, the Sanarelli bacillus agrees with the colon and typhoid bacilli. Moreover, from cultures of all three of these organisms, on special media, it is possible to obtain large numbers of what I have designated as giant-whips. Loeffler[1] was the first to observe and photograph these peculiar forms, which he found in cultures of the symptomatic anthrax bacillus on blood-serum. Subsequently (1893), I found these same forms in cultures on agar and blood-serum of a new anaerobic bacillus; also, in malignant edema, in symptomatic anthrax, and in tetanus. These strange forms were also found in the body of guinea-pigs, after inoculation with the first-mentioned organism. Excellent illustrations of these giant-whips were kindly made for me by Pfeiffer of Berlin, and will be found in my paper, *Zeitschrift für Hygiene*, Bd. 17, 209. Sakharoff[2] has met with and figured similar forms, which he obtained from gelatin cultures of the *B. asiaticus*. It is not necessary in this connection to decribe the giant-whips as found in cultures of the Sanarelli, colon, and typhoid bacilli, since they resemble exactly the form described in the papers referred to above. Moreover, at an early date I hope to publish my studies as to the conditions under which these composite, or giant-whips, form.

According to Sanarelli the B. icteroides when grown in bouillon after a few days give rise to characteristic involution forms. These are short filaments bent or twisted, with enlargements at or near the end. At times these are quite abundant, and again may be very rare. These peculiar forms are, however, by no means characteristic of the Sanarelli bacillus. A careful study was made of the involution forms formed in bouillon cultures of the various colon and typhoid bacilli under examination. When these were grown under the same conditions, side by side, with the Sanarelli bacillus, similar forms were observed in all. In some of the typhoid cultures the involutions were more numerous than in others. Similar variation was observed among the several colon bacilli. The cultures of the Emmerich and Havelburg bacilli were especially rich in the long, filamentous, nodular involution forms. The degen-

[1] *Centralblatt für Bakteriologie*, vii, 635, 1890.
[2] *Annales de l'Institut Pasteur*, vii, 550, 1893.

erative forms of the B. icteroides agree therefore with those of the colon-typhoid group.

Another fact which goes to show the relationship of the Sanarelli bacillus to the colon-typhoid group is its resistance to destruction by gaseous disinfectants such as sulphur dioxid and formaldehyd. In the study of the value of these gases for room disinfection which I have made in common with my assistant, Mr. H. H. Waite (MEDICAL NEWS, May 21, 1898), the typhoid, colon, Sanarelli, and Havelburg bacilli were included. In each experiment these organisms were exposed, in duplicate, on silk threads (*S*), muslin squares (*M*), and on cover-glasses (*G*). The specimens were exposed to the action of the gaseous disinfectant in a room having a capacity of 1016 cubic feet (28.3 c.m.) for twenty hours, in open sterile Esmarch dishes. When wet these specimens were invariably disinfected. If, however, they were previously dried at 39° C. for two to three hours, they were less easily destroyed. The cover-glasses with the germs spread on only one side were, as might be expected, disinfected first. The disinfection of the muslin squares in the Havelburg set was undoubtedly due to the fact that these had not dried completely. The following summary of the results obtained with dry specimens is taken from the first three tables in the paper referred to:

		Sulphur 3 lbs.		Sulphur 6 lbs.		Paraform 60 g.		Formalin distillation, 150 c.c.	
Typhoid bacillus.	S.	+	+	+	+	+	+	+	+
	M.	+	+	+	+	+	+	+	+
	G.	O	O	O	O	+	O	O	O
Colon bacillus.	S.	+	+	+	+	+	+	+	+
	M.	+	+	+	+	+	+	+	+
	G.	+	O	O	O	O	O	+	+
Sanarelli.	S.	+	+	+	+	+	+	+	+
	M.	+	+	+	+	+	+	+	+
	G.	+	O	O	O	+	O	+	+
Havelburg.	S.	+	+	+	+	+	+	+	+
	M.	O	O	+	+	+	+	+	+
	G.	O	O	O	O	+	O	+	+

+ =positive growth. O=no growth.

It is evident from the above results that the four organisms possess about the same degrees of resistance to these gaseous disinfectants. This fact, taken in connection with what has been shown above, clearly indicates the relationship of the Sanarelli and Havelburg bacilli to the colon-typhoid group.

This marked degree of resistance of the Sanarelli bacillus is borne out by its behavior to cold. The experiments on this point will be discussed in the last part of this paper.

The foregoing facts demonstrate: first, that the Havelburg bacillus is a non-motile colon bacillus; second, that the Sanarelli bacillus belongs to the typhoid group although, like the colon bacillus, it gives off acid and gaseous products.

IV. RELATION OF THE SANARELLI BACILLUS TO YELLOW FEVER.

In order to obtain a clear understanding of the real relation that this organism bears to yellow fever it is desirable in the first place to present a brief summary of the bacteriological results obtained by Sanarelli in his examination of the human subject. In all thirteen subjects were examined.

CASE I.—Subject died on the sixth day. On post-mortem examination gave seven kinds of bacteria; among these can be mentioned the colon bacillus and a pseudo-typhoid bacillus. The *B. icteroides was absent.*

CASE II.—Subject died on the seventh day. The blood drawn from the finger the evening before death, as well as the blood from the cadaver; also, the spleen, liver, lungs, urine, and bile gave a *"certain quantity" of the B. icteriodes.* In the kidneys and in the tracheal and bronchial secretions it was associated with the colon bacillus. It was not present in the intestinal contents and it is worthy of note that it was in connection with this case the first wherein he found the B. icteroides that Sanarelli arrived at the rather early and very positive conclusion that "the favorable habitat of the microbe of yellow fever is not in the digestive canal."

CASE III.—Subject recovered. On the sixth day of the disease blood was drawn from the finger and was *sterile.* The urine gave cultures of the colon bacillus. *No B. icteroides.*

CASE IV.—Subject recovered. The blood drawn from the finger, as well as hepatic fluid obtained by puncture on the eighth day of the disease remained *sterile.* Similar material drawn on the ninth day gave two kinds of bacteria, *one of which, very rare, was the B. icteroides.*

CASE V.—Subject died on the fifth day. Various bacteria, colon bacilli, and streptococci were present. The kidney alone gave *several colonies of B. icteroides.*

CASE VI.—Subject died on the fourth day. The blood, organs, intestinal and gastric contents gave only the colon bacillus. *No B. icteroides.*

CASE VII.—Subject died sixteen hours after entering the hospital. Urine and bile were sterile. The intestinal and gastric contents contained colon bacilli, streptococci, and diplococci. The tissues contained abundance of streptococci. *No B. icteroides.*

CASE VIII.—Subject died six days after entering the hospital. Blood from the finger as well as hepatic fluid and bile drawn on the second day after entering, or four days before death, gave *pure cultures of the B. icteroides.* This was rare in the blood,

fairly abundant in the hepatic fluid, and very abundant in the bile. On post-mortem examination, made two hours after death, the blood, bile, liver, spleen, kidneys, and urine gave an abundance of B. icteroides associated with staphylococci. The tracheal fluid contained the B. icteroides, colon bacilli, and a torula. The gastric and intestinal contents gave only colon bacilli.

CASE IX.—Subject died in six days. Blood from the finger, and hepatic fluid, drawn the day before death, remained *sterile*. On post-mortem examination of the blood and organs most of the culture media remained *sterile*. A few contained a small bacillus. *One out of six tubes* inoculated with material from the kidney *gave the B. icteroides*. The other five tubes were sterile.

CASE X.—Subject died on the sixth day. Blood from the finger and hepatic fluid drawn eleven hours before death, remained *sterile*. On post-mortem examination, made six hours after death, numerous bacteria were present but *no B. icteroides*.

CASE XI.—Subject died on the eighth day. All the cultures made from the blood, spleen, kidneys, bile, and pericardial fluid were either *sterile* or gave a staphylococcus. The urine gave colon bacilli and staphylococci. Numerous cultures were made from the liver *and all but one remained sterile*. The one tube mentioned received 3 c.c. of *hepatic fluid* and developed a club-shaped bacillus which was assumed to be B. icteroides. On rather forced passage through a rabbit the B. icteroides was eventually obtained. It is evident then that this organism was present in exceedingly small numbers and was feebly virulent; otherwise the body was practically sterile.

CASE XII.—Subject died on the twelfth day. Numerous cultures made with an abundance of material from the blood, liver, bile, spleen, and urine remained *perfectly sterile*. The kidneys gave several colonies of a bacillus resembling that of chicken cholera. Two tubes of agar inoculated with *heart-blood* showed feeble growth in the water of condensation, and it was only after passage through animals, as in Case XI., that it was possible to identify the B. icteroides.

CASE XIII.—Subject died on the eighth day. The bile was sterile. The blood and urine contained a few colon bacilli and staphylococci. The liver contained colon bacilli; *B. icteroides was not found*.

It is evident then that the B. icteroides was found in only *seven out of thirteen cases*, or, in other words, in only 53.8 per cent. According to Sanarelli, the third subject who gave negative results and recovered should be excluded, whereas the fourth, who likewise recovered but gave a positive result is, of course, retained.

As can be easily seen from the preceding summary, in the seven cases where positive results were obtained the B. icteroides was, as a rule, far from being numerous. Thus: Case II., the blood and organs contained the B. icteroides in "certain quantity"; Case IV., the bacillus was very rare in the blood and hepatic fluid; Case V., the kidney only gave several colonies of the B. icteroides; Case VIII., gave abundant growth of the B. icteroides; Case IX., the kidney only, and then but one out of six tubes, gave a culture of the bacillus; Case XI., of the numerous cultures made from the liver (and other organs) all were sterile but one, and that gave an atypical growth of the B. icteroides; Case XII., of the numerous cultures from various organs all were sterile, and only the heart-blood gave an atypical growth of the B. icteroides.

It is evident that, in addition to the very low percentage of cases of yellow fever in which it is found, the B. icteroides is, as a rule, present in very small numbers. *In only Cases II. and VIII. can there be said to be an abundant growth. In the remaining cases the bacillus was present in only one organ, and then in mere traces.*

In the recent report of Pothier (*Jour. Amer. Med. Assoc.*, p. 884, April 16, 1898) on the results of the bacteriological examination of presumably fifty-one cases of yellow fever at the Isolation Hospital at New Orleans, it would seem that he has been able to find the B. icteroides in but *three cases*.

It can truly be said that in no infectious disease where the cause has been demonstrated can the specific organism be found in such a small percentage of cases, and in such small numbers as has been shown to be the case for the B. icteroides.

Sanarelli recognizes this serious defect in his work, and endeavors to explain why it is not present more often and in greater number. Two reasons are deduced. First, the bacillus multiplies very little during the disease, and a small amount of toxin can produce severe symptoms of the disease. Second, the toxin, directly or indirectly, by the lesions it produces facilitates secondary infection. Of these two propositions the first is of the most importance. In five out of seven cases where the bacillus was present it was found in extremely small numbers. The assumption that it produces a very powerful toxin, as in diphtheria or tetanus, would, if confirmed, assist in explaining this anomaly. Is it true, however, that the bacillus produces a powerful toxin?

In his second memoir Sanarelli deals especially with the effects of the toxin, which was prepared by filtering through porcelain ordinary bouillon cultures 15- to 20-days old. Of this filtered liquid 15 to 20 c.c. are necessary in order to kill guinea-pigs in 24 hours. Smaller doses, 2–5–10 c.c., decrease the weight temporarily, but the animal recovers. Ten c.c. or more are necessary intravenously to kill rabbits in 7 to 8 days. In one experiment made

by me 10 c.c. of the filtered culture 4-days old killed a rabbit weighing 1770 gr. in 11 days, whereas 20 c.c. of an 8-day culture killed in about half a day. Similar filtered cultures of the Havelburg bacillus proved even more deadly than those of B. icteroides. In dogs 5 to 10 c.c. injected subcutaneously produced local tumefactions, and "even in large quantity is absolutely incapable of producing the characteristic symptoms of yellow fever." With living cultures Sanarelli claims (*loc. cit.*, p. 501) to produce in dogs the symptoms and principal lesions of yellow fever, and yet the supposed powerful toxin is incapable of producing such symptoms in these same animals. Intravenous injections, as might be expected, are more powerful, and may produce vomiting and diarrhea, but the animal soon recovers if the dose is moderate. A larger dose of the toxin, 150 to 200 c.c., will kill the animal! When such enormous quantities must be injected to produce death it is useless to speak about a powerful toxin. And as far as the vomiting and diarrhea of dogs is concerned, after injection of living or filtered cultures, these symptoms afford no support in establishing the presumed etiological relation of B. icteroides. These symptoms, vomiting and diarrhea, are observed in dogs when injected with most any colon bacillus or with the filtered products.

The goat appears to be much more susceptible to the toxin, since death was caused in one instance when 37 c.c. were injected subcutaneously in seven doses within eighteen days. Strange to say, however, in this very susceptible animal the bacteriological examination was negative. That is to say, the toxin did not assist secondary infection as Sanarelli would expect.

It should be noted in passing that Sanarelli at times employed bouillon cultures sterilized with ether. These are said to be more powerful than when filtered. Ether itself sometimes contains highly toxic substances which can be easily demonstrated by allowing a few hundred c.c. to evaporate and then injecting the residual liquid into a guinea-pig. Death may result in an hour or two with most powerful pathologic changes. Ether should not be employed for animal experiments where injections are practised unless it is known to be free from this poison. Cultures of the Sanarelli bacillus sterilized at 57 to 58° F. are less active than filtered cultures.

Not content with the inoculation of toxin into common animals, Sanarelli resorted to experiments on the human subject. These experiments were not published in the *Annales de l'Institut Pasteur*, and I should have made no reference to these were it not that they have been published *in extenso* in the *Annales d'Igiene Sperimentale*, vol. 7, 1897, and have been freely mentioned in American and English journals.

Two subjects received respectively 2 and 5 c.c. of the filtered toxin subcutaneously. Apart from painful, local swelling, some depression, and lack of appetite, no further results were obtained. The most powerful effects, however, followed the intravenous injection of 10 c.c. of the toxin. Incessant vomiting, complete anuria, delirium, and coma were the result; 5 c.c. intravenously in another subject produced likewise very serious results. A fifth subject was not so susceptible and was given 44 c.c. in four injections in eleven days.

Sanarelli sees in these experiments a perfect demonstration of the relation of his bacillus to yellow fever. To a critical observer his conclusion is not justifiable. Nothing is stated concerning the physical condition of the subjects and the presumption is that they were hospital patients. It is a well-known fact that an animal once subjected to a disease, an infection, or an intoxication, is vastly more susceptible than a healthy organism to subsequent inoculation with a poison. Roux and Martin,[1] for instance, observed that a horse which had received three injections of the pneumococcus of Fraenkel was extremely susceptible, even after the lapse of a year, to the diphtheria toxin (½–1 c.c.). An animal once acted upon by any microbic poison, even though apparently fully recovered, is much more sensitive than a new animal. During the past year I have had numerous demonstrations of this very important fact. Owing to the scarcity of guinea-pigs, I was obliged to use a second time animals which had been inoculated with the diphtheria toxin, or with various bacteria from water, cheese, etc. Although a considerable time had elapsed after the first injection, and the animals had apparently fully recovered, yet when inoculated with the B. icteroides they would invariably die in from twelve to eighteen hours, whereas the time for healthy guinea-pigs, according to Sanarelli, ranges from three to six days. Tuberculous guinea-pigs likewise proved to be exceedingly susceptible to the Sanarelli bacilli.

The reaction of the tuberculin in tuberculous animals likewise constitutes an illustration of what has been said. Blood-serum in itself is certainly non-poisonous, and yet instances are known where the injection of diphtheria antitoxin has been followed by speedy death. This is not due to any poison in the antitoxin, nor is it necessarily due to so-called idiosyncrasy. The organism has been weakened by the action of the diphtheria poison and becomes, therefore, exceedingly susceptible to an otherwise harmless substance. Guinea-pigs that have survived

[1] *Annales de l'Institut Pasteur*, 8, p. 617, 1894.

injections of diphtheria toxin and apparently have fully recovered, will frequently die within an hour after an intraperitoneal injection of 2 or more c.c. of normal serum of man and other animals.

It is evident, therefore, that the weakened conditions of the patients at the time of the injection had more to do with the profound symptoms observed than the toxin introduced. The feebleness of the toxin is seen when subcutaneous injections were practised; and, also, in the fifth case. Moreover, it should be borne in mind that we know nothing about the results in man following intravenous injections of the filtered products of even the most common bacteria. What would be the results in man following intravenous injections of micrococcus prodigiosus, colon bacillus, Eberth bacillus, etc.? In all probability such injections would bring about very serious results, especially in previously diseased individuals.

The conclusion, then, which forces itself upon us, is that Sanarelli's experiments on man have absolutely no practical value and do not prove the existence of a powerful poison nor its fancied relation to yellow fever.

There is still further evidence which goes to show that the B. icteroides does not create a powerful poison. It certainly elaborates poisons within the cell, as in the case of the colon bacillus, vibrio of Asiatic cholera, etc., but this poison does not readily diffuse into the surrounding medium. If the filtered culture contained an active toxin, it should, on injection into an animal, eventually yield an *antitoxic* serum. Through the kindness of Dr. McClintock of the biological department of Parke, Davis & Co., subcutaneous and intravenous injections of the filtered cultures of the B. icteroides were made into a horse. The animal received in the space of five months 974 c.c. of the toxin intravenously and subcutaneously. The serum of that animal has no more value than normal rabbit-serum in preventing infection with the Sanarelli bacillus. The failure, then, to obtain a distinctly antitoxic serum confirms the conclusion arrived at above, namely, that B. icteroides does not produce an active, soluble toxin.

In a recent number of the "Public Health Reports" of the United States Marine Hospital (April 15, 1898, p. 371) there is a statement quoted from Sanarelli that he has been unable to obtain antitoxic serum, and that when injections of cultures were made the serum was bactericidal, not antitoxic. This is in line with the fundamental researches of Roux, Metschnikov, and Salimbeni on immunity against the cholera vibrio. The above acknowledgment places Sanarelli's serum beside the anticolon, antityphoid, and Pfeiffer's anticholera serums. The results obtained by Sanarelli in the treatment of yellow fever with this serum are exactly what might be expected. Of thirty patients treated, ten died, a mortality of thirty-three per cent.[1] The mortality in yellow fever is subject to very great variation. During the recent epidemic in New Orleans it was about eleven per cent. In South America it undoubtedly does rise at times to forty or fifty per cent.

The second reason presented by Sanarelli, in order to explain the difficulty of finding the B. icteroides in the body, was that the specific toxin of the yellow-fever microbe, by its action on the organs, favored secondary infections. The colon bacilli, staphylococci, and streptococci thus introduced, are supposed to outgrow, or even suppress, the B. icteroides, and thus create the difficulty in detecting this organism. In guinea-pigs and rabbits inoculated with B. icteroides the blood and internal organs almost invariably contain pure cultures of this bacillus. In these animals apparently the toxin does not exert this favoring action. Sanarelli himself recognizes this fact. In the goat referred to, which died after repeated injections of the toxin, there was likewise no secondary infection.

In looking over the summary of results obtained by Sanarelli in his examination of yellow-fever subjects it should be noticed that the blood from the finger, and the hepatic fluid were sterile in Cases III., IV. (eighth day), and IX. In Cases IX., XI., and XII., the internal organs were practically sterile and yet in each of these cases the B. icteroides was found in only one tube out of a large number that were inoculated. According to Pothier the blood of eight out of ten yellow-fever patients was sterile.

Undoubtedly it is true that in yellow fever, as in nearly all infectious diseases, secondary invasion is likely to occur, and may be expected, as the result of the action of the specific poison. This invasion, as pointed out above, is by no means constant in yellow fever, and consequently does not constitute a sufficient explanation of the failure to find the germ in not more than 53.8 per cent. of the cases, nor does it explain the small number of the B. icteroides present in most of these cases.

In order to detect the B. icteroides in the internal organs of man, Sanarelli employs a method which is open to serious objection. In view of the fact that the bacillus occurs in small numbers, its detection in tissues is said to be difficult. To facilitate its detection in the several organs, these are first washed with mercuric chlorid and suspended in an incubator

[1] Since the above was written Sanarelli has published a fourth paper (*Annales de l'Institut Pasteur*, p. 348, May, 1898). The statement is made that the mortality was 27 per cent. in 22 cases treated. In the paper 31 cases are described, with a mortality of 32 per cent.

at 39° C. for twelve hours. Under these conditions the organisms present multiplied so that on subsequent sectioning and staining groups of bacteria could be readily demonstrated. Sanarelli assumes that the groups of bacteria thus demonstrated are those of B. icteroides. This is a mere assumption, since any colon bacillus that might be present would give rise under those conditions to exactly the same groups, and the individuals comprising these could not be distinguished from B. icteroides.

Pieces of the liver, kidney, and spleen from Case II. were thus treated and are figured in Plate XII. of Sanarelli's memoir. It is of interest to note that in the description of this case the kidneys are expressly said to contain the B. icteroides associated with the colon bacillus (*loc. cit.*, p. 442). May not, therefore, the group of bacilli shown in Fig. 4, Plate XII., consist of colon bacilli? No definite statement is made regarding the presence of colon bacilli in the spleen or liver, but it is quite reasonable to assume, being present in the kidney, that they were likewise present in the other two organs. Consequently conclusions based upon such methods of work cannot be received with much confidence.

It follows from what has been said that Sanarelli has failed to comply with the first rule of Koch as to the constant presence of this organism in yellow fever. In the action of the pure cultures of the B. icteroides on animals, Sanarelli claims to obtain the final proof of the relation of this organism to the disease. These results, however, are not above question and have no more actual value than the toxin experiments already referred to. According to Sanarelli, the injection of B. icteroides in guinea-pigs produces a cyclic disease which cannot, as a rule, be influenced by the amount of the injected culture. That is to say, the animals usually die in from five to eight days regardless of the dose employed. This cyclic character, on which so much stress is laid by Sanarelli, is by no means constant.

After repeated passage through collodium sacs, employing the method of Roux, Metschnikov, and Salimbeni, it is possible to obtain twenty-four-hour bouillon cultures of this organism which, injected intraperitoneally into guinea-pigs in doses of 1 c.c. as a rule, will prove fatal in less than eighteen hours. The sac method of exalting the virulence of this organism is not necessary, however, to accomplish this result. Vigorous cultures, obtained by frequent transplantation, will give exactly the same result. Consequently, the so-called cyclic character is manifested only by cultures that have already been weakened. Whether the guinea-pig dies early or late the heart-blood and internal organs contain pure cultures of the organism. There is an entire absence of secondary infection. In this respect, as well as in its "cyclic" character, B. icteroides resembles the bacillus of hog-cholera.

The experiments on rabbits are of special importance because of the pathological alterations produced, especially in the liver and kidneys, by this organism. Fatty degeneration of the liver can easily be demonstrated. Moreover, the kidneys show marked inflammatory changes in the glomeruli and in the cells of the tubules. Albumin, and hyalin to epithelial casts, may be found in the urine. These results, it should be remembered, are by no means characteristic of this organism. There is scarcely an infectious disease in man in which some fatty degeneration of the liver and nephritis do not occur. In general, it may be said that infections and intoxications lead to fatty degeneration and to nephritis. These results can be obtained in a number of experimental diseases, even in more pronounced form than with B. icteroides. Thus, a rabbit received a subcutaneous injection of a mixture of three different colon bacilli and died in four days. Neither one of these by itself would under like conditions produce fatal results. The urine contained albumin and casts. The liver showed numerous white spots. On hardening in Flemming's solution and subsequent staining with safranin, exquisite fatty degeneration was demonstrated. In these sections the fat globules were more abundant than in the liver of a rabbit after inoculation with B. icteroides (Sanarelli, Plate XIV., Fig. 2). Sections of the kidney showed marked parenchymatous degeneration. The tubules were frequently filled with detritus, and in many cases the cells were completely loosened. In the above experiment then, as was expected, the same degenerations were obtained, even more pronounced than with the Sanarelli bacillus. No special importance, therefore, can be attached to the experiments of Sanarelli on rabbits.

According to Sanarelli, the dog is the best animal for reproducing the lesions and symptoms of yellow fever. It should be noted at the beginning, however, that the dog is not very susceptible, and hence it is necessary to introduce relatively large doses of the virus by intravenous injection. The marked fatty degeneration of the liver and of the kidney is considered by him as proof positive of the identity of the experimental disease with the yellow fever of man. The vomiting, diarrhea, and icterus were regarded as additional, conclusive evidence of this relationship.

These results might be considered of value if control experiments with other organisms had given negative results. There is no evidence, however, to show that Sanarelli made any comparative trials with other related organisms. Proper controls, in

this and other experiments, would have prevented error. In the first place, the above-mentioned symptoms, vomiting, diarrhea, etc., are produced in dogs as a result of various injections. I have met with these symptoms frequently in dogs after the injection of bacteria found in cheese, milk, etc. Of special importance in this connection are Emmerich's experiments on dogs with B. Neapolitanus (*loc. cit.*, p. 342). A dog which received a subcutaneous injection of this colon bacillus reacted with frequent vomiting and profuse diarrhea. In three days it lost 450 gr. in weight, and was so weak that it could not stand up. A monkey likewise reacted to Emmerich's bacillus with diarrhea and vomiting, coma, and death.

Not only can certain bacteria, such as the colon bacillus, induce vomiting and diarrhea, but as pointed out above they can induce exquisite fatty degenerations. In cats, Emmerich observed marked fatty degeneration of the kidney. Fatty degeneration of the liver and kidneys can, therefore, be brought about by various organisms.

A third fact observed by Sanarelli in his experiments on dogs was that the gastro-intestinal mucous membrane was often altered and showed hemorrhagic infiltrations. Similar alterations have been described by Emmerich in cats, dogs, and monkeys. Other organisms can induce like infiltrations, as Sanarelli himself indicates.

From the above it is evident that Sanarelli's bacillus produces in experimental animals a disease not unlike that following colon infection. The symptoms and pathological lesions, therefore, do not establish an identity between that disease and yellow fever. From the evidence thus far adduced it is clear that the B. icteroides is not proven to be the cause of yellow fever. From the facts which follow it will be seen that this organism cannot be the cause of this disease.

Agglutination.—The behavior of the Sanarelli bacillus to serum was given a careful, thorough study. The microscopical examination of hanging drops of serum, inoculated with the various organisms, was always resorted to in studying this phenomenon. Where dilutions were employed these were made by adding to a drop of serum, 10, 20, 30 drops, etc., respectively, of distilled water by means of a drawn-out tube pipette. The inoculations were made from agar cultures grown for 20–24 hours at 39°C. The first specimen tested was an antipest horse serum. This, when undiluted, gave prompt and complete agglutination in less than 15 minutes. Another pest serum behaved in a similar manner. A normal horse serum produced excellent agglutination in half an hour. Subsequently a large number of specimens of serum from various sources were examined. The serums of fifteen horses immunized against diphtheria, tetanus, and colon bacillus invariably agglutinated the Sanarelli bacillus in less than one hour when undiluted. In dilution of 1–10 most of these produced agglutination within 2 hours. In dilution of 1–20 less than one-half produced light agglutination within 2 hours. The undiluted serum of normal guinea-pigs likewise produced prompt agglutination. As a rule, the agglutination ceases with a dilution of 1–10, but in several instances good agglutination was obtained at 1–20 and even at 1–30. The serum of guinea-pigs infected with Sanarelli's bacillus shows no quantitative difference when drawn immediately after death, and compared with the serum of the same animal drawn just before inoculation. Normal rabbit serum behaved in exactly the same manner as guinea-pig serum. The blood of seven normal persons and of one sarcoma patient were likewise examined. When undiluted, each one of these agglutinated the Sanarelli bacillus in less than one hour. In dilutions of 1–10 a slight agglutination was given in the same time.

In general it may be said that the serum of healthy men and animals will promptly agglutinate the Sanarelli bacillus. Such serum will give a more or less marked reaction even when diluted with ten parts of water. On further dilution, as a rule, agglutination does not take place.

These results are at variance to some extent, and serve to explain certain results obtained by Sanarelli. These differences are probably due to the fact that Sanarelli has employed the macroscopic method, adding the serum to bouillon cultures in a test-tube, and observing whether or not a deposit formed. This procedure is very defective, and it is not to be compared in accuracy with the microscopic method described above. According to Sanarelli the blood of yellow-fever cadavers possesses a variable power of agglutination. The blood of a convalescing yellow-fever patient induced very slow agglutination. An antidiphtheric serum produced a very rapid, whereas antityphoid serum brought about a partial, agglutination. He further states that the normal blood of man and of many other animals does not induce the phenomenon of agglutination (*loc. cit.*, p. 755). The experiments detailed above effectually disprove this assertion.

Sanarelli in his experiments on men injected with the filtered cultures of his bacillus[1] notes that the serum in the third and fourth case, in a dilution of 1–5, gave a precipitate of the bacillus in twelve hours. The serum of the fifth subject, in a dilution of 1–10, gave complete precipitation in two hours at 37° C., "as if it were the serum of a vaccinated ani-

[1] *Annali d'Igiene Sperimentale*, 7, p. 445, 447, 449.

mal." With reference to these cases Sanarelli arrives at the rather forced conclusion that they represented classical types of yellow fever, and that the fifth case corresponded to repeated typical attacks of abortive yellow fever.

As a matter of fact, as stated above, normal serum of man and animals will cause agglutination in the dilutions mentioned above, and even at times in greater dilutions. The serum-tests in the above-mentioned experiments on man then do not support the interpretation that the intoxication induced was that of yellow fever.

It has been suggested (Lerch) that the agglutination of the Sanarelli bacillus by the serum of yellow-fever patients was of diagnostic value. The fact that normal serum, even when diluted, yields agglutination effectually disproves this statement.

In the preceding part of this paper it has been shown that the Sanarelli bacillus agrees with the colon, typhoid, and Havelburg bacilli in its resistance to destruction by gaseous disinfectants. Experiments with mercuric chlorid, carbolic acid, and lysol have likewise shown that the B. icteroides is a relatively resistant organism. This fact is still further emphasized by the following experiments which it will be seen effectually disprove the claim of its causal relation to yellow fever. It is a well known fact that yellow fever is exclusively a disease of the warm countries. It cannot gain a permanent foothold in the United States, for the simple reason that cold stops its ravages. The first good, sharp frost effectually puts an end to an epidemic of yellow fever. Cold, then, is a most effective and reliable agent for destroying the yellow-fever microbe. To accomplish this end extreme cold is not necessary. The Sanarelli bacillus will not grow at zero° C. Tubes of bouillon, agar, and gelatin, inoculated with this organism and kept immersed in melting ice for two weeks, showed no sign of growth. At the end of that time when placed in the incubator they promptly developed, and these cultures were as pathogenic to guinea-pigs as normal cultures. Even when kept for a month at zero degree the resultant cultures were fatal as usual to guinea-pigs.

The minimum temperature at which the B. icteroides will grow is about 10° C. Agar and bouillon cultures were allowed to develop at this temperature in an ice-chest, and were then left there for five months. In other words, they were kept for five months at a temperature of 10° to 15°C. At the end of that time these cultures were transplanted to bouillon. One c.c. of this new culture developed for 36 hours at 39° C., injected intraperitoneally into a large guinea-pig produced death in 6 days. Evidently no attenuation had taken place, and yet under these conditions one would expect to meet with a weakened yellow-fever germ. On November 29th cultures of the Sanarelli bacillus were placed outside the window, and allowed to remain there for fifteen days. The average minimum temperature for that period was 26.4° F. (−3.6° C.), and the average maximum temperature was 36° F. (2.2° C.). At the end of this period the germs grew as well as before, and their virulence was not diminished.

The following experiment is of still more importance. Agar cultures of the B. icteroides were placed outside of the window for three days during very cold weather. During the first day the temperature ranged from −2° to −13° C. The temperature on the second day ranged from −10° to −20° C., and on the third day from 0° to −15° C. It should be said that most of the time during these three days the temperature was below −10° C. At the end of the first, second, and third days transplantations into bouillon were made. These bouillon cultures were developed for 36 to 40 hours at 39° C., and the resultant growths were in every respect normal. Each culture injected intraperitoneally into new guinea-pigs in doses of 1 c.c. produced death in from 18 to 20 hours.

This last experiment may be considered as a crucial test of the relation of the Sanarelli bacillus to yellow fever. Freezing for three days at a temperature below −10° C. had absolutely no effect on the virulence of this organism. As pointed out above, epidemics of yellow fever are promptly brought to an end by a sharp frost. In other words, the microbe of yellow fever is exceedingly sensitive to cold. This certainly cannot be said to be the case with the Sanarelli bacillus. This organism in its behavior to cold again shows that it is related to the colon-typhoid group. If, therefore, the Sanarelli bacillus were the cause of yellow fever we would expect to find this disease, like typhoid fever, distributed the length and breadth of the American continent regardless of climatic conditions.

The conclusions arrived at in this study can be briefly summarized:

1. The Havelburg and Sanarelli bacilli are distinct.

2. The Havelburg bacillus belongs to the colon group.

3. The Sanarelli bacillus undoubtedly belongs to the typhoid group.

4. Neither the Havelburg nor the Sanarelli bacillus is the cause of yellow fever.

The etiology of yellow fever is yet to be worked out. The microbes of Havelburg and Sanarelli are to be placed in the already long list of disproved causes. The negative bacteriological results, taken

in connection with the epidemiological facts observed in this disease, would seem to indicate that the cause will not be found in our group of bacteria. It is more than likely that the germ of yellow fever, as well as those of smallpox, measles, hydrophobia, etc., belongs to a group of organisms, smaller than our bacteria, and as yet unknown, awaiting discovery. The recent work of Roux and Nocard on the microbe of pleuropneumonia already proves the existence of organisms smaller than the "infinitely small" bacteria.

HYGIENIC LABORATORY, UNIVERSITY OF MICHIGAN.

WAR ARTICLE.

THE INVASION OF PORTO RICO FROM A MEDICAL STANDPOINT.

BY NICHOLAS SENN, M.D.,
LIEUTENANT-COLONEL, U. S. V., CHIEF OF THE OPERATING STAFF WITH THE ARMY IN THE FIELD.

THE occupation of Cuba and the Philippine Islands by our conquering navy and army in such rapid succession seemed to increase the desire of conquest and opportunities to test the strength of our arms. With the destruction of the weak navy of our enemy there was nothing in the way of sending troops to any of the many Spanish possessions. The fall of the heroic Cervera and his faithful little band off the harbor of Santiago before the murderous fire of our well-equipped fleet cleared the pathways of the ocean of further sources of danger. It was but natural that the beautiful island of Porto Rico, one of Spain's most valuable possessions, should have been selected by the military authorities as the next objective point for contention. Repeated attacks by our navy on its best stronghold, San Juan, had failed to bring about surrender and to give a foothold on Porto-Rican soil. So far the navy had taken the lead in bringing Spain to terms and the army was anxious to do its share in wresting from its greedy grasp another enslaved people. Major-General Miles, who conducted the invasion in person, decided to march upon San Juan from several directions, and after uniting the forces attack the city jointly. The experience gained in Cuba had taught us an important lesson in conducting the Porto-Rican campaign. General Miles laid his plans wisely and with special reference to gain the desired object with as little suffering and loss of life as possible. Every movement in this campaign was made with a due regard for the welfare and success of our troops rather than a desire for personal gain and aggrandizement which characterized the Cuban campaign as every one knows. He was well aware of the depressing effects of the tropical climate on the unseasoned troops and of the necessity of resorting to timely and efficient precautions in preventing disease. From experience and personal observation he recognized the fact that the unavoidable privations incident to war are multiplied many times when the seat of war is a strange and remote country which presents a climate and environments unfamiliar to the invading force. His actions were clean-cut admissions that he was in need of a medical advisor and that they were influenced by the frequent consultations held with the chief surgeon. The war in Porto Rico was conducted upon the most humane principles, and although no great battles were fought, victory upon victory followed the footsteps of our army and in less than three weeks our flag floated over three of the largest cities of the island. Our troops love and respect their leader and have followed him without fear and grumbling under the scorching sun, full of confidence and trust.

The news that an armistice had been declared reached the headquarters at Ponce, August 14th, and the troops are now resting on their arms awaiting the final adjustment of the terms of peace. Eager to fight, yet every soldier in the field received this message of peace with joy and enthusiasm, fully satisfied that the army had done justice to the flag and country it represents. Colonel Charles R. Greenleaf, chief surgeon of the army in the field, accompanied General Miles on his trip from Guantanamo to Porto Rico and has been with the army ever since. He was long enough in Cuba to gain a full insight into the horrors created by infectious diseases which so constantly follow large armies, especially in a war of invasion. He was amazed when he saw to what extent yellow fever had broken out during the few weeks the troops had been in Cuba. There was no difficulty in tracing the disease to a total lack of precaution on the part of the general in command. Colonel Greenleaf had given his advice and directions before the army left Tampa, but they were not heeded. Owing to want of cooperation on the part of General Shafter the medical officers found themselves powerless in preventing and combating the dreaded disease. Colonel Greenleaf's prompt and energetic action on his arrival in Cuba did much in suppressing the disease, but it was too late to guard against a general outbreak. The many recent graves in Cuba containing the remains of the victims of this disease are the best proof of what will happen when the leader of an army ignores the health and comfort of his men. In planning the Porto-Rican invasion General Miles availed himself of the invaluable services of his chief surgeon. The expedition was well equipped with medicines, hospital stores, and medical officers to meet all possible emergencies. The result has been that the army has been so far singularly exempt from disease with the exception of typhoid fever and the effects of heat, both beyond the control of medical officers. Since his arrival in Ponce Colonel Greenleaf has been the busiest man in the army. He has not been content in simply issuing his orders from headquarters, but he has attended in person to the execution of every detail. He has visited the camps, the hospitals, and exercised personal oversight over the distribution of hospital supplies, instruments, and medicines. Anxious to serve the sick and wounded, impatient when face to face with a slow, hesitating subordinate, he has more than once performed temporarily the duties of an ordinary hospital steward to furnish a much needed object lesson. His work justifies the confidence imposed when he was appointed to the high and responsible position he holds.

FIRST SKIRMISH.

General Miles landed with his expedition, which included a number of war-vessels, at Guanico, Monday, July 25th. The harbor was entered by the now famous little gunboat "Gloucester," under the command of Lieutenant-Commander Wainwright. A landing was effected by thirty sailors, the Spanish flag was hauled down and the Stars and Stripes raised amid the cheers of the sailors who knew well that what they had just witnessed meant liberty and freedom for the down-trodden people of the island of which they had just taken possession. The planting of the flag and the deafening cheers which reechoed from the hills of the liberated island were followed by a volley from the hidden enemy, which was promptly responded to by the guns of the "Gloucester" and a Colt rapid-fire gun which had been taken ashore. The Spaniards fled in confusion and sought shelter among the adjacent hills, leaving four killed on the field, while our soldiers escaped without a scratch.

The turn of the infantry came soon after landing in the form of a lively skirmish in which we lost one killed and fifteen wounded, of whom one died a day or two later. Most of the injuries were flesh wounds which healed in a remarkably short time. A very interesting incident occurred during this skirmish. The day was hot and our troops had to ascend a steep hill from the crest of which the Spaniards defended themselves. One of the volunteer soldiers, outrunning his comrades, advanced far ahead of his line, and when he had nearly reached the Spanish position was overcome by heat. He fell in a semi-unconscious state. A Spanish doctor rushed to his aid with a stretcher and two hospital-corps men, administered the necessary restorative, and had him conveyed at once within our line. This one act alone goes to show that the Spaniards have often been unjustly accused of being cruel and inhuman. This certainly has not been the case during the present war. From my own observations I am sure that they have respected the Red Cross. In fact the Red-Cross people of Porto Rico, composed largely of Spaniards, have shown the greatest activity and interest in their humane work during the entire campaign. If anything, they have rather been over zealous, judging from the number of insignia displayed and worn. It was a common thing to see men wearing a white cap with an immense red cross on top, another one in front, besides the brassard. Ponce was taken and occupied without any resistance whatever. The citizens received our soldiers with enthusiasm and manifestations of joy. General Miles was hailed as a long-looked for friend rather than a conqueror.

The next engagement occurred between Arroyo and Guayama, between a small Spanish force in ambush and General Haines' brigade, and resulted in eleven wounded on our side. The only death following this skirmish was that of a soldier of the Third Illinois Infantry who was shot accidentally by an unknown man of the Fourth Pennsylvania Regiment. The bullet caused an extensive non-penetrating injury of the chest from the effects of which he died next day. Such accidents have occurred too often during the present war and to prevent repetition in the future this matter should be investigated, as was done in this instance, by the proper authorities. Among the injured was a man who was shot through the pelvis, and another one the subject of a gunshot wound of the elbow-joint, both of them doing well a few days later when I examined the wounded in the Brigade Hospital at Guayama. The third skirmish took place between the advance column of General Wilson's Division on the march to San Juan and a small Spanish force entrenched on the summit of a high and steep hill. Lieutenant Haines, the son of General Haines, was the only one who was brought on board the "Relief" August 14th. One of the wounded was operated on by Dr. Parkhill in an ambulance. The abdomen was torn open by a fragment of a shell, the intestines protruded, and a resection had to be made of a loop for a tearing injury. It was reported that the patient rallied well from the immediate effects of the operation and that hopes were entertained of his recovery. Another engagement took place between the troops under command of General Schwan on their way from Ponce to Mayaguez and about 1000 Spaniards ambushed four miles from the latter city. The fight resulted in two killed and eighteen wounded on our side. All of the wounded were brought on board the hospital ship "Relief," which called at Mayaguez on her way to New York August 15th.

Such is a brief account of the casualities sustained by our army during the Porto-Rican campaign. The experience here coincided with that gained in Cuba to the extent of confirming the humane nature of the modern weapon. The proportion of killed to wounded is even smaller than in the Cuban war, as well as the number of seriously injured. Thanks to the more elaborate preparations for the campaign the wounded received prompt and efficient attention. The suffering of the well, sick, and wounded cannot be compared with what I saw in Cuba. War is a great educator and should we again be called upon to invade a foreign country, we shall profit by the experience of the past.

TYPHOID FEVER IN PORTO RICO.

The native doctors in Ponce, Porto Rico, gave us the assurance that not a single case of yellow fever had been seen in that city for the last three years. We were informed that in San Juan isolated cases occur from time to time. Malaria is prevalent in all the valleys, more especially in and around Ponce. The large pendulous abdomens and the pale faces of the many little naked children in city and country are the best witnesses in showing the prevalence of malarial intoxication. Typhoid fever is endemic in certain localities, but at present Ponce is almost free from this disease. Having seen the destruction of life and the indescribable suffering caused by yellow fever in Cuba, Colonel Greenleaf naturally turned his attention toward protecting our troops in Porto Rico against this scourge. The proximity of Porto Rico to Cuba, and the many possible sources of infection made such a course imperative. That this fear was not unfounded, and that the chief surgeon recognized the danger, and made use of

timely precautions are best shown by the contents of a letter addressed to the Adjutant-General, Headquarters of the Army, and Circular No. 1 issued before the army sailed from Guantanamo to Porto Rico, and a copy of the quarantine regulations formulated at the same time.

Headquarters of the Army,
On Board the U. S. S. "Yale," en route
to Porto Rico, July 23, 1898.

To the Adjutant-General, Headquarters of the Army.

SIR: I have the honor to submit the following recommendations for the prevention, as far as possible, of the introduction of yellow fever into the command now about to land on the island of Porto Rico:

The assignment of an officer of rank, to be placed in command of the base of supplies, with authority to indicate the sites to be occupied by the various supply-depots and the hospital, and to enforce the regulations governing the health of the attachés of these departments and the persons who may visit them on business.

The assignment of a sanitary inspector whose duty it shall be to examine all vessels and persons arriving at our base from seaward ports, and to prepare sanitary regulations for the government of all transportation and persons arriving and departing from stations by land. The officer should have authority to quarantine all suspected persons and means of transportation, and to disinfect their belongings either by fire or by such other means as may be deemed necessary.

All persons connected with the army are forbidden to enter any building whatever on the island without express authority from these headquarters, and all buildings in rural districts that may be suspected of harboring the germs of disease should be destroyed by fire or otherwise disinfected.

As woven goods, particularly those of woolen fabric, are special carriers of disease, the purchase or acceptance of articles of this kind from stores or inhabitants of the island is strictly forbidden. Any such property found within the lines will be at once destroyed and the holder subject to punishment.

That the commanders of regiments be instructed to prepare their camping-grounds with great care and maintain a rigid police in them; under no circumstances shall they camp on ground that has previously been occupied either by troops or collective bodies of the inhabitants.

That medical officers be required to make frequent inspections of the commands to which they belong and that any suspicious case of fever be immediately isolated and the fact of its occurrence reported to these headquarters.

Canteens should be filled daily with tea or coffee, and these beverages used habitually instead of water, unless that has been previously boiled.

Very respectfully,
CHARLES R. GREENLEAF,
Colonel, Assistant Surgeon-General, U. S. A., Chief Surgeon, Army in the Field.

Headquarters of the Army, Office of the Chief Surgeon, On Board U. S. S. "Yale," en route to Porto Rico, July 24, 1898.

Circular No. 1.

1. Medical officers will, upon receipt of this circular, report to the chief surgeon of the army the number of medical officers, hospital stewards, acting hospital stewards and privates of the hospital corps on duty with their command. Also the number of ambulances, litters, and tents, and if medical supplies are insufficient, note the general character needed. This report will be made on the enclosed form:

2. A field hospital will be organized at the army base as soon as possible after landing, and a depot of supplies will be connected with it. As we are widely separated from our source of supplies a strict economy in their use is necessary; surgeons of divisions and brigades will give their personal attention to this important subject.

3. Extreme vigilance is enjoined upon medical officers in the matter of camp sanitation, errors in this particular being promptly reported to the respective commanding officers.

4. The experience at Santiago has demonstrated the efficiency of properly applied first dressings in gunshot wounds; these should be left untouched until the patient arrives at the base hospital, unless the condition of the wound absolutely demands a redressing en route from the first-dressing station. All diagnosis tags will be marked "Dressing not to be removed," or "Redressing required," as the condition demands. Unless an imperative necessity exists, surgical operation will not be attempted at the front.

CHAS. R. GREENLEAF,
Colonel, Assistant Surgeon-General, U. S. A., Chief Surgeon, Army in the Field.

QUARANTINE REGULATIONS FOR THE BASE OF MILITARY EXPEDITION TO PORTO RICO.

1. Every vessel shall be officially visited by the inspector before communication is made with other vessels or the shore.

2. A vessel having yellow fever or smallpox on board shall not be allowed to communicate with the shore, or with other vessels, but shall leave the island.

3. Vessels coming from sources of infection shall be detained five days without communicating either with the shore or with other vessels. If at the expiration of this time no cases of fever shall have developed, landing may be made under the following precautions:

All fomites shall be disinfected by one of the following methods: Immersion for one hour in 1-1000 solution of bichlorid; sulphur fumigation in a chamber 24 hours, four pounds of sulphur being used for each 1000 cubic feet of space, or boiling half an hour with complete immersion. The following need not be disinfected unless directly exposed to infection:

All new and dry material unpacked, all iron and steel implements, all goods in new and original packages not having been broken or packed in an infected locality. Goods other than textile contained in textile material, such as coffee in sacks, bacons, spices, etc., kept dry, and not broken in an infected locality, do not require disinfection other than the container, which shall be treated as fomites as above. Fruits, sound, unless exposed in an infected locality, need no disinfection. Live stock may be admitted.

Such ships shall be thoroughly cleansed and disinfected by the free use of 1–1000 solution of bichlorid, and by fumigation with sulphur before they may again receive men or supplies.

Ships quarantined shall display the usual flag, and those in detention shall be visited by the inspector daily until the time of quarantine shall have expired.

4. Vessels carrying passengers or having fomites from localities of infection, though they (the vessels) may hail from healthy ports, shall be subject to the same quarantine restrictions as vessels known to hail from infected localities.

5. Due precaution shall be taken to prevent infection of the base of supplies through communicating with infected localities along the line of march, by teamsters, and others. As far as possible they should not be allowed to remain at the base longer than necessary to load and unload, nor to come in such contact as to communicate infection. Stragglers, prisoners, and strangers should be immediately sent away.

CHARLES R. GREENLEAF,
Colonel, Assistant-Surgeon General, United States Army; Chief Surgeon, Army in the Field.

Major Woodbury was appointed sanitary inspector. He met with the hearty cooperation of the city authorities of Ponce in the performance of his onerous and often unpleasant duties. The sanitary condition of the city underwent a great improvement in a few days. The water-supply was found satisfactory. The absence of a sewerage system threw many obstacles in the way. The appearance of smallpox in a village some distance from Ponce made vaccination necessary among the soldiers and natives who were not protected against the disease. An abundant supply of vaccine virus was on hand, and was at once issued and used. When I arrived at Ponce, August 7th, I found typhoid fever raging to an alarming extent. It was desirable to trace the origin of the disease. The absence of typhoid fever during this season of the year, its outbreak in all the commands, and the short time that had intervened between leaving the United States and the landing in Porto Rico, made it probable that the disease could be traced to the infected camps occupied by the troops before leaving for Porto Rico. General Miles was very anxious to obtain reliable information regarding the origin and spread of this disease. Pursuant to the following order I made an extensive and systematic investigation:

Headquarters of the Army,
Office of Chief Surgeon, Port Ponce, Porto Rico,
August 11, 1898.

Lieutenant-Colonel Nicholas Senn, Surgeon, U. S. V., Chief of Operating Staff of the Army.

SIR: You will proceed to the town of Ponce, visit the military and other hospitals of that town, and such of the camps in its vicinity as you may deem necessary, for the purpose of investigating and, if possible, determining the cause of typhoid and other fevers now prevailing in the army, and report the result of your investigation in writing to me. Should you find it necessary to have the services of an interpreter, or other civilian to aid in your work, you are hereby authorized to employ him, sending the bill to this office for payment.

Very respectfully,
CHARLES R. GREENLEAF,
Colonel, Assistant Surgeon-General, U. S. A., Chief Surgeon, Army in the Field.

I obtained accurate information of two hundred fever patients, of which number 90 per cent. were well marked typhoid fever, the balance malaria and the result of sunstroke. I estimated the number of fever patients in Ponce and in the immediate vicinity at 250. In extending my inquiries to General Brook's command, with headquarters at Guayama, I found about 145 additional cases; however, in that locality malaria seemed to predominate. Most of the patients came from Chickamauga by way of Charleston and Newport News. The Second and Third Wisconsin Regiments furnished the largest contingent. Almost every soldier in the different hospitals belonging to either of these regiments suffered from typical typhoid fever, and what attracted my attention was that the disease appeared to be of a more serious type than in most of the men belonging to other regiments. The locality from which these regiments came, when encamped at Chickamauga, must have been badly infected.

As the result of my investigation, I reported to Colonel Greenleaf the number of cases found, and that in my opinion the disease was contracted in every instance before leaving the camps in the United States. In view of the fact that most of the cases came from Chickamauga I suggested at the same time that the Medical Department should recommend immediate evacuation of that camp. In Ponce most of the patients found shelter and care in the Spanish Military Hospital, then in charge of Major Ten Eyck, U. S. A. The Club House and a school for girls of the Sisters of Charity were also placed at the disposal of the chief surgeon and were soon filled with patients. Miss Chanler of New York did excellent service as a nurse in the former temporary hospital. A congestion which occurred in the Military Hospital, and which could not be prevented, took place when General Wilson's Division moved forward and unloaded at the door all of the sick in the Division Hospital, some 150 in number. The overcrowded condition was remedied the next day when a large number of the more gravely ill were sent on board the "Relief," anchored in the harbor of Ponce. Medical supplies were in abundance at all times and were freely issued without any formality. The "Relief," and later the yacht "May," brought an abundant supply, with many delicacies for the sick. Milk was bought and freely supplied to the sick. It was the intention of the chief surgeon to establish an extensive outdoor receiving hospital as soon as the tentage arrives, which, according to information received from the Surgeon-General, was then on the way. The number of new cases of typhoid fever in the Porto-Rican army will probably be a limited one, as the victims of this disease were immediately separated from their comrades, and if the troops are recalled as soon as the treaty of peace has been signed we need entertain little fear of the indigenous spread of the disease.

CLINICAL MEMORANDA.

SIMPLE TALIPES EQUINUS.

BY JAMES K. YOUNG, M.D.,
OF PHILADELPHIA.;
PROFESSOR OF ORTHOPEDIC SURGERY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF ORTHOPEDIC SURGERY IN THE WOMAN'S MEDICAL COLLEGE, ETC.

IT is a fact well known to surgeons generally that simple forms of clubfoot are rare, the compound forms predominating. The first two cases here recorded are interesting on account of the patients having presented themselves within a day of each other, on account of their rarity, and, the first case, because primitive equinus is so rare that Tamplin discredits its congenital origin entirely, not having seen a case. To these are added three cases which were seen previously.

The relative frequency of simple equinus, taken from a large number of cases which were treated in the Orthopedic Dispensary of the University Hospital, is found to be as follows: Acquired equinus 16 per cent.; congenital equinus 2 per cent.

CASE I.—W. H. K., white, male, aged eight years. Had the ordinary diseases of childhood. Family history negative. Labor was not instrumental. Upon examination marked pes equinus was found, which had existed since birth; the heel of the right foot was two inches from the ground. The child also had internal strabismus. The operation was performed on the day of admission, the Achilles tendon being divided and a plaster-of-Paris cast applied with the foot in an over-corrected position. The application of an apparatus was not found necessary.

CASE II.—E. S., white, female, aged three years and eight months. No family history of interest. One and one-half years before the child came under observation she had an attack of infantile paralysis which resulted in a partial paralysis of the muscles of the left leg. Upon examination a limp was seen on the affected side and the muscles were slightly atrophied; the circumference of the left calf was 8½ inches, of the right 8¼ inches. The diagnosis of simple equinus was apparent. The Achilles tendon was divided and the usual plaster-of-Paris dressing applied with the foot at a right angle, this not being over corrected because it was a palsy and not a congenital case. The after treatment prescribed was massage and electricity, to be followed by an ankle brace with equinus stop.

CASE III.—S. N., white, female, aged seven years. At two years of age she had had infantile paralysis. When first seen there was contraction of the Achilles tendon and slight atrophy of the leg, with measurements as follows: Length of right limb, 23⅝ inches; of left limb, 24 inches; circumference of right thigh at 3 inches, 11¼ inches; of left thigh at 3 inches, 12¾ inches; circumference of right thigh at 7 inches, 14¾ inches; of left thigh at 7 inches, 15½ inches; of right calf, 10 inches; of left calf, 10½ inches. Right dorsal scoliosis was also present. Tenotomy was performed, followed by the application of a shoe to which ⅜ inches of cork was added inside. This was followed by massage and electricity, which increased the size of the part. The recovery was perfect and the child walked without a limp.

CASE IV.—F. G., white, female, aged eight years. Family history negative. Labor was normal. Had a hemiplegia in early childhood. When the case came under observation the hemiplegia was still present, the arm being atrophied and contracted. The leg measurements were as follows: Length of right leg, 27 inches; of left leg, 26½ inches. The foot was in equinus position and the patient walked with a decided limp. An attempt was made to correct the deformity by mechanical stretching, but without success, after which a tenotomy of the Achilles tendon was performed. This was followed by the use of a shoe elevated with a half inch of cork inside and an ankle support with an equinus stop.

CASE V.—E. T., white, female, aged eight years, of good ancestry. Labor was difficult and the child was delivered with forceps. The present deformity occurred at two years of age and consisted of a right hemiplegia. When the case came under observation June 22, 1898, the arm had recovered but the deformity of the lower extremity was still present. There was contraction of the Achilles tendon, the heel being raised 1½ inches from the ground. There was slight atrophy of the right leg, the circumference of the right calf being 9½ inches, and that of the left 9⅞ inches. Tenotomy of the Achilles tendon was performed and this was followed by the adjustment of an ankle brace with equinus stop.

These cases, when properly treated, give the most satisfactory results of all orthopedic cases, and in many instances the deformity is not only corrected, but the disposition of the child is improved.

APPENDICITIS IN A CHILD. SARCOMA OF THE HUMERUS. TUBERCULOSIS OF THE RIGHT KIDNEY AND URETER.

BY WILLIAM D. HAMILTON, M.D.,
OF COLUMBUS, OHIO.

CASE I. *Appendicitis in a Child.*—Edna D., aged nine years, was brought to Mt. Carmel Hospital by Dr. Callinan of Corning, April 7, 1896. Forty-eight hours previously she had been taken with general abdominal pain and vomiting. On the day before her admission her physician first saw her. He diagnosed appendicitis and advised operation. Her condition upon admission was as follows: She was well nourished, but evidently very sick. Her cheeks were highly flushed, pulse 138, and temperature 100° F. Some tympanites; irregular and modified dulness over the entire right half of abdomen, with extreme tenderness. She had vomited dark-green material during the day. She evidently had suppurative peritonitis. The right lower segment of the abdomen was most tender.

Ether was given, and after the parts had been cleansed an incision was made over McBurney's point. In making the section the infiltrated abdominal walls were suggestive of pus, which, upon entering the cavity, was found external to the cecum. It was at once evident that the fluid was not walled off by adhesions; that there was pus in the loin and in the pelvis as well, and that she had a

general purulent peritonitis. A median incision was made opposite the cul-de-sac, and more pus was found. The appendix could be felt overlapping the external iliac vessels and dipping into the pelvis. Although but eight minutes had been spent, including that in irrigation, she was suffering from shock. It was, therefore, deemed wise to insert gauze drains, and to allow the operation to remain incomplete. Strands of gauze were inserted from the loin to the opening in the groin; also, from the cul-de-sac through to the lower angle of the median incision. Several ounces of pus had been evacuated. The next week she was better. On April 18th, however, she complained of pain and tenderness in the loin, and had fever. She was again etherized and a counter opening made in the right loin, which allowed the escape of the lumbar accumulation.

On May 9th a third operation was performed. The openings previously made were explored for the appendix. It had originally been located on the brim of the pelvis. It was finally found in the loin, outside of the colon, buried in a mass of adhesions, from which it was with difficulty enucleated. It contained a concretion. Although one hour was consumed in the operation there was no shock. Her convalescence was uneventful. She is now in perfect health.

CASE II. *Sarcoma of the Humerus.*—A. L. F., a farmer, aged forty-two years, a resident of Arblia, Union County, Ohio, entered the hospital April 23, 1896. His family history was good, no case of malignant disease having occurred. He had had good health. He stated that in June, 1895, he strained his right arm in lifting. He supposed that the bone was "cracked" at the time of the accident, although he used the member with some discomfort until November, 1895. In that month, however, when using an ax, the humerus broke spontaneously at the middle. Since then the member had been useless. He could make some movements below the wrist, but few if any above that point. A fusiform, rather solid enlargement of the arm, involving the upper half, reached nearly to the shoulder. A hypodermic needle having been driven into the growth, an ounce of dark-colored, bloody serum was withdrawn.

A diagnosis of malignant disease, probably sarcoma, was made, and an operation performed on May 1st. In order to minimize hemorrhage it was thought best to ligate the subclavian artery in its third portion. A tourniquet could not be applied as there was no room for it. Amputation was performed at the shoulder-joint above the diseased portion of bone. The loss of blood was very slight, and there was no shock. The patient made a prompt recovery, has increased in weight and strength, and is enjoying excellent health.

The specimen was afterward examined and was found to be a sarcoma. The growth was as large as two fists. For two-thirds of its length the humerus had disappeared. Spicula of bone could be seen in the substance of the growth.

CASE III. *Tuberculosis of the Right Kidney and Ureter.*—The patient, an unmarried woman, aged twenty-three years, was referred to me by Dr. Robert Shannon of Piqua, Ohio. There was no history of tuberculosis in her family. She had been healthy until a few months previously, when she was taken sick with a disturbance of the bladder. She had fever and frequent and painful micturition. She had lost about fifteen pounds in weight. Soon after her illness began catheterization was necessary on account of retention. The urine was drawn three or four times a day. Pus was always present. A fortnight before her admission to the hospital vesical irrigation was frequently carried out, but without benefit. After admission she voided her urine every few minutes. She was unable to sleep. A urinalysis at this time showed it to be alkalin and free from sugar. Its specific gravity was 1028, and pus was present in large amount. No tubercle bacilli could be found then or subsequently. Cystoscopy by my colleague, Dr. Charles S. Hamilton, by the Kelly method, showed that the base of the bladder was inflamed and red, and at one point at the base of the organ it bled rather readily. The right ureter was thickened and was palpable through the vagina for a distance of three inches. During ether anesthesia, the right kidney, somewhat enlarged and slightly movable, could be felt in the loin. On two subsequent occasions, once without ether, cystoscopy was repeated, the last time on November 25, 1896, when redness of the base of the bladder in the ureteral region, with occasional areas where the normal glaze of the bladder was absent, was noted. The region of the right ureteral orifice was reddened more than any other part of the bladder. The left ureter was catheterized and the instrument left in place long enough to collect several ounces of urine, which was subjected to microscopic and chemical examination with negative results, no evidence of disease being found. The patient's appetite was poor. Her heart and lungs were normal. A boggy, tender lump, somewhat larger than a fist, could be felt in the right loin in the region of the kidney. Its size seemed to vary at different times.

A diagnosis of tubercular pyelonephritis, with ureteritis, was made, and an operation performed on December 31, 1896. Ether was given, and a firm pillow placed beneath the left loin. A six-inch incision, from near the last rib, was made obliquely downward and outward to within one and one-half inches of the right anterior superior spine of the ilium. The kidney having been exposed, it was peeled from its fatty capsule. It was movable, and the lower end was larger and evidently distended with pus in such a way as to increase its size one third. The pelvis and vessels were freely exposed, and the kidney delivered onto the surface of the abdomen. The vessels were tied with silk in two parts, leaving a long button after division. The ureter was tied just below the pelvis of the kidney, and touched with carbolic acid. When the ureter was divided a teacupful of urine and pus, curdy in character, escaped and soiled the field of operation somewhat. The usual toilet of the wound was made, and it was partially closed, with iodoform-gauze drainage. The pedicle was tied with strong silk. There was practically no shock. Time, one hour and fifteen minutes. The patient once or twice became very cyanotic as

a result of the anesthesia, and her tongue had to be drawn forward. She was soon convalescent, and her temperature became normal. A few days after the operation some fever resulted from suppuration about the ligated ureter. She gained ten pounds in weight, menstruation, which had been absent during her period of invalidism, returned, and her vesical annoyance was about relieved.

On examination of the removed kidney it was found that the typical appearances of tuberculous pyelitis were present. The pelvis of the ureter was dilated, and coated here and there with miliary tubercles. The ureteral obstruction was evidently caused by dilatation of the pelvis and the resulting atrophy of the renal cortex.

The redness of the bladder seen on cystoscopic examination was considered to be due to the irritating character of the urine discharged from the kidney, and not to tuberculosis of the bladder-wall or mucosa. The patient had suffered from attacks of renal pain when the distention of the kidney with pus and urine was greatest. These attacks were terminated invariably by a free discharge of purulent urine from the bladder. She soon experienced great relief from the dysuria. I would have been inclined, however, to advise removal of the kidney, even though the bladder had shown, *in a mild degree*, the lesions of tuberculosis, on the ground that the kidney was the primary focus of the disease, and that no amelioration of vesical symptoms could have been expected until the bladder had been freed from the injurious effect of purulent and irritating urine from the diseased kidney. I have seen at least one case in which manifest tuberculosis of the bladder in the female was cured by removal of a tuberculous kidney, the patient being in good health and free from symptoms two years after the operation.

MEDICAL PROGRESS.

Removal of the Saphenous Vein for Chronic Phlebitis.—VIKO (*Jour. Amer. Med. Assoc.*, July 9, 1898) removed, with complete success, the saphenous vein, from the inner malleolus to one inch above the knee, in a case of chronic phlebitis. As a result of this operation, the patient was for the first time in fourteen years freed from swelling, induration, and eczema of the leg, and could walk and stand with comfort. Since this operation gives such good results in varices the writer thinks that it should be equally helpful in chronic phlebitis, where the veins have lost their function anyway, and act only as irritants. Drugs may for a time relieve the eczema, pain, and swelling, but their action is only temporary, while in surgical measures as above described, there is hope of a speedy and complete cure.

Results of Treatment with Superheated Air. — REED (*Philadelphia Polyclinic*, August 6, 1898) gives some of the results obtained in a year's use of the Sprague Hot Air Therapeutic Apparatus. Not only were patients benefited who suffered from rheumatism and gout, but the success of this treatment in bronchial and asthmatic difficulties, in tonsillitis, conjunctivitis, and many nerve troubles was abundantly demonstrated. Hot air proved itself a sovereign remedy for sprains, bruises, and synovial effusions. In gout, even if tophi have formed, they may still sometimes be softened and discharged through the excretory organs, as the skin and kidneys are stimulated by the hot blood, and circulation is restored to the affected part. Sleep returns to the sleepless, and the general economy is rejuvenated. Sciatica of some months' standing, lumbago, and torticollis were sometimes cured in one application, as were lobar pneumonia and pleurisy. Rheumatoid arthritis was treated with varying success. The soreness and general symptoms were generally relieved, but often the stiffness of the joints remained in spite of repeated applications. In all cases where persistent efforts were made, the progress of the disease was checked. Altogether Reed had at his command records of 1400 applications of high degrees of heat, in a great variety of affections, and from the study of these cases he is well satisfied that the use of superheated air is capable of a wide application in medicine, and will help in the better understanding of lithemic affections. When the nature of the malady was such that the body of the patient was placed in the apparatus, the heat employed was from 250°–260° F. If the arm or leg was placed in the cylinder, the air baths were often given at a temperature of from 300°–350° F. Any apparatus which will not give as high a temperature as this must be of limited service.

Traumatic Suppurative Splenitis.—CROMWELL (*Maryland Med. Jour.*, August 13, 1898) was called to see a strong and healthy girl, aged seventeen years, who to avoid being caught in a shower had run a mile to her home. During the last part of this run she had a severe pain in her left side, but did not stop for it, and the pain subsided of itself some minutes after she had reached the house. It recurred the next day and become more severe. Two days later an examination revealed a tumefaction on the left side of the abdomen and above it a deep sulcus, which the patient said was caused by the band of her petticoat, it being very tight. The patient could obtain a degree of comfort by lying continuously on her right side. Iodin and blisters proving of no avail in reducing the inflammation, an incision was made through the abdominal parieties, and into the substance of the inflamed spleen, and a great deal of blood, followed by pus escaped. The flow of pus continued for several days under the influence of emollient poultices, and after it ceased there was a flow of serum lasting several days longer. The total discharge of blood-pus and serum was estimated at thirty ounces. The girl made a perfect recovery.

Piperidin as a Uric-Acid Solvent.—TUNNICLIFFE and ROSENHEIM (*Lancet*, July 23, 1898), who, some time since, called attention to the solubility in water of piperidin urate, have more recently been conducting investigations in order to see if this remarkable property of piperidin can be utilized in medicine. Their plan was to study the subject from (1) a chemical and pharmacological, and (2) a clinical point of view. The first part of their research has been completed, and the report has been presented

under the following heads: I. Chemistry. II. Conditions which must be filled by any drug to justify its therapeutic use in the uric acid diathesis, including under this head gout. (*a*) Proof of the non-poisonous nature of the drug in doses equivalent to those in which it would have hypothetically to be administered; (*b*) the demonstration of the drug as such in the urine; (*c*) the property of dissolving (1) uric acid (on the distal side of the excreting membrane of the kidney), (2) urinary sediment, and (3) sodium biurate in the blood. Under *c* a comparison is given between the power of piperidin and that of other known uric-acid solvents.

This outline gives an idea of the scope of the report. The conclusions stated in the words of the writers are as follows:

"1. Tartrate of piperidin may be safely given to a man in doses of 15 grains (1 gram) three times a day or oftener, in uric-acid gravel and in gout.

"2. Taking all the conditions into account, this substance is preferable to any other drug up to the present introduced for this purpose, having the additional advantage of being sufficiently cheap to render it within the reach of every one.

"3. Lysidin, piperazin, and urotropin all have an influence in increasing the solvent power of serum for sodium biurate and urine for uratic deposit in varying proportions, but to a less extent than piperidin."

These experiments, so far as they have gone in this direction, tend to show that all these substances diminish the total amount of uric acid excreted, but not the total amount of nitrogen. This fact seems to indicate that these substances have a double action, in that, although capable of acting as uric-acid solvents, they also exert an influence upon metabolism.

The close relationship between the constitution of uric acid and xanthin bases renders it possible that under the influence of these reducing agents (to which class uric-acid solvents mostly belong) uric acid is in the body transformed into xanthin or its immediate allies. This reduction has recently been accomplished in the laboratory with the help of formic acid, chloroform, and potassic hydrate.

An Unusual Complete Rupture of the Aorta.—ASHWIN (*Lancet*, July 9, 1898) reports a case of complete rupture of the aorta occurring in a man aged fifty-six years, in which life was prolonged for more than five hours after the break took place. The patient was walking quietly on level ground when he fell suddenly. He was unconscious, and was at once carried into a hospital. He was in a state of profound collapse, from which he did not recover, though he twice vomited matter without special characteristics. He was thought to have suffered from cerebral hemorrhage. The examination made after death showed that the pericardium contained about six ounces of freshly coagulated blood, and that the aorta was torn clear across about three-fourths of an inch above the semilunar valves, and that the pericardium covering the vessel had been stripped up as far as the origin of the innominate artery. This lesion, and a further most remarkable one by which the lumen of the torn vessel was kept patent, explained the length of life after so serious an accident. This was an invagination of the distal ruptured end into the transverse portion of the arch. The intima of the invaginated portion looked inward, not outward, and it was not evident how this could be possible until the invagination was reduced. Then it was seen that the ruptured end of the vessel had been turned inward and passed through a rent in the wall of the aorta just below the origin of the innominate. A second invagination had taken place, the end of the vessel being again turned inward, and passed through a second rent in its own wall a little nearer to the heart than the preceding one. By this means the lumen of the distal portion of the ruptured aorta was preserved, so that the blood which escaped from the upper end of the vessel into the pericardial sac could continue its course into the descending aorta. No explanation of this unusual invagination is offered. Any one may reproduce it by taking a soft rubber-tube of large lumen and cutting two holes in the opposite sides, distant about two and three inches respectively from one end. Then disregarding the hole nearest the end of the tube, invaginate the end of the tube as far as the second hole, pulling it out through this hole. Next invaginate into itself the end of the tube which protrudes through this hole, causing the end of the tube to pass through the hole nearest the end into the lumen of the non-invaginated portion of the tube. The lumen of the tube will thus be reestablished, but imagination fails to depict how this could take place in the living aorta. There were no lesions of the cardiac valves, and only a slight hypertrophy of the left ventricle, and several small atheromatous patches in the aorta.

The Role of Clothing in the Causation of Disease.—GOLDSCHMIDT (*Therap. Monatshefte*, July, 1898) says that too little attention is paid to the effect of clothing in producing disease and of causing symptoms in those already ill. The weight of the clothing is often a serious load for an invalid, and the effect of perspiration is to increase the weight sometimes as much as threefold, this depending on the nature of the material, etc. In phthisical and rachitic individuals, in whom the sweat is so profuse, such an increase of weight may mean a great deal. The evil effects which other patients may suffer from uncomfortable corsets, tight collars, stocking supporters, and leather shoes are fully treated of by the author. Local pressure is a disadvantage, though a general even pressure may, in some instances, be a help to recovery, as illustrated by the benefit obtained in ulcer of the leg from an even elastic bandage. Friction from the clothing is a further subject for consideration. If upon the sensitive parts of the body, for instance the genitals, this may produce nervous symptoms, or it may develop or retard the cure of an eczema, etc. The effect of different kinds of clothing is different in this respect, just as the fibers of cotton, wool, and linen vary in harshness, conductibility for heat, and in the ability to absorb moisture. The color of the clothing and the weave of the goods must also be considered in reference to the conditions under which it is to be worn if one desires to give really intelligent advice as to its fitness.

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SATURDAY, SEPTEMBER 17, 1898.

THE ARMY INVESTIGATION.

THE vigorous and persistent demand of the country for an official inquiry into the causes of the alleged neglect, mismanagement, and consequent suffering of our soldiers has finally drawn from President McKinley an order for an investigation. Technically, and as a matter of formality, this order came in answer to a report from Secretary Alger. Surgeon-General Sternberg saw the necessity for this weeks ago and promptly placed on file a petition for a Court of Inquiry. Had this request been acted upon immediately some conclusion might have been reached in time to be of service in ameliorating the condition of some of the transports and rendering service to the army in Porto Rico.

It is well, however, that the investigation is to be prosecuted now. The proposition of the President is broad in its scope and prescribes an examination into the conduct of the commissary, quartermaster, and medical bureaus of the War Department during the war, and into the extent, causes, and treatment of sickness in the field and in the camps. The investigation will, therefore, cover the entire conduct of the war and probe to the bottom all the charges of neglect and inefficiency that have been made. The personnel of the committee of investigation, as already outlined, gives promise of most thorough, impartial, and searching work. The pressing need of the hour and the work that will be productive of immediate beneficial results is indicated in the last part of the President's pronunciamento and has reference to the extent, the causes, and the treatment of sickness in the camps. Active operations in the field are at an end, but the Volunteer camps will be continued for a year or two, and some more efficient means must be devised and enforced to keep them free from disease than has obtained during the past few months. To discover, apprehend, and punish those who have been responsible for the neglect and suffering of our soldiers in Cuba and on the transports may be important as a warning in the future, but the immediate health of the troops in camp is a far more urgent cause of anxiety. The discovery of the cause of disease and the establishment of such sanitary and hygienic regulations as shall protect and preserve the health of the Volunteer Army is the demand of the hour.

IODOFORM IN LOCAL TUBERCULOSIS.

LOCAL tuberculosis occupies a place in surgical pathology that astonishes the surgeon himself when he looks over his case-book at the end of a year and finds what a high percentage of his cases have come under that category. If he is in attendance at a children's hospital this percentage mounts to a very high figure. The surgery of tuberculosis, however, is not confined to the use of the scalpel, curette, and bone-chisel, since one of the most decided advances along this line is the positive demonstration that *iodoform* is curative when brought in contact with tuberculous tissue. This fact has led to its extensive use as an injection into all tuberculous areas and its value is far greater than the average practitioner realizes. Tuberculous joints need not always be excised, caries of the spine is most beneficially influenced by iodoform, and cold abscess in any part of the body should be treated by this method before open operation is suggested.

Billroth and Mikulicz were among the first to propose the injection of such cavities with a ten-percent. solution of iodoform, and the following repre-

sents the accepted method of procedure at the present day: The tuberculous abscess or joint cavity is first tapped under strict aseptic precautions with a large trocar and the semi-fluid contents and tissue fragments withdrawn. The cavity is then thoroughly irrigated with sterile-water, and a ten-per-cent. mixture of iodoform in glycerin injected through the trocar to a full distention of the cavity. The filled cavity or joint is then manipulated to bring the iodoform solution in contact with every interstice of its interior. A gradual absorption of the glycerin leaves powdered iodoform in direct contact with every part of the tuberculous lining membrane. The cavity usually refills and the process must be repeated two or three times at intervals of a few weeks before a cure is effected. The iodoform appears to cause a breaking down of tuberculous membrane lining such a cavity, the underlying tissues are stimulated to throw out granulations which help to soften and throw off the membrane, and the cavity eventually cicatrizes. Normal cartilage in a joint is unchanged by the iodoform and the amount of motion regained in such a joint will depend upon the extent of the destruction already existing in the articular cartilage.

The best point for puncture in the wrist is just below the styloid process of the ulna, and in the elbow-joint just above the head of the radius. In the hip a point is chosen just above the greater trochanter (the thigh adducted and rotated inward) and the needle thrust directly inward until it strikes the head of the femur. The knee is best tapped on either side beneath the patella, and the ankle beneath the malleoli. Anesthesia is unnecessary in any one of these processes. A joint retains its swelling, as a rule, after the first injection and a slight reaction is present, but with subsequent drainage and injection of the joint at intervals of three or four weeks, the tissues become firmer and the swelling disappears. As a primary measure in all cases of joint tuberculosis this method possesses great value, and in such cases as spinal caries (Pott's disease), where the diseased bone is inaccessible to operation it is invaluable. Of course in those cases of bone tuberculosis where an open operation may remove entirely the diseased area and leave the parts in a condition suitable for permanent cure, operation is to be preferred. Tuberculous sinuses are much benefited and often healed by the use of a ten-per-cent. solution of iodoform in olive oil. The orthopedic surgeon is certainly teaching us two very important facts with regard to local tuberculosis; first, that the condition is amenable to treatment to the degree of perfect cure; and second, that the attainment of this result requires unlimited patience and perseverance.

ECHOES AND NEWS.

Professor Virchow in London.—Professor Virchow will deliver the next Huxley lecture at Charing Cross Hospital, London, in October. It is proposed by the prominent members of the profession of London to extend to him the courtesy of a public dinner at which Lord Lister will preside.

Spanish Prisoners Arrive in Spain.—The Spanish transport "Satrustoqui" is reported as having arrived at Santander, Spain, from Santiago with Spanish prisoners. General Lenares, the former commander of the Spanish forces at Santiago, was a passenger. There were eighty-three deaths during the voyage.

The Tri-State Medical Society.—The Tenth Annual Meeting of this Society, consisting of the members of the profession of Alabama, Georgia, and Tennessee, will be held at Birmingham, Ala., Tuesday, Wednesday, and Thursday, October 25, 26, and 27, 1898. Dr. Frank Trester Smith of Chattanooga, Tenn., is the secretary.

Alleged Poisoning from Eating Canned Meats.—So common, a few months ago, were the cases of alleged poisoning from eating canned (tinned) meats in London that the London Chamber of Commerce appointed a special committee to investigate the matter. The committee has reported that it invariably found such allegations to be unfounded.

Sick Soldiers at Santiago.—Major Lawton, commanding at Santiago, reports that there are not more than fifty of the Fifth Army Corps now remaining in Cuba who are sick. Two hundred and sixty-one convalescents and others left Santiago last week on the "Vigilancia." She arrived at Montreal September 13th. There were three deaths during the voyage. Sixty men were transferred to hospital.

Dr. Pratt and the Chicago Academy of Medicine.—Dr. James G. Kiernan, the Secretary of the Chicago Academy of Medicine, announces over his signature that the recently issued catalogue of the Chicago College of "Osteopathy" contains the assertion that the "orificialist surgeon," E. H. Pratt, one of its faculty, is a member of the Chicago Academy of Medicine. Dr. Kiernan says that he has never been a member, nor is he eligible.

Americans Killed in Battle.—The official records of the War Department, as far as completed September 6th,

show that during the war with Spain there were 33 officers and 231 enlisted men of the army killed in battle, a total of 264. This number includes all the lives lost in battle in the Philippines as well as those in Cuba and Porto Rico. The percentage of officers killed is strikingly large, and is said to be unprecedented in the battles of the world.

The Denver Meeting of the American Medical Association.—The generous hospitality accorded the members of the Association and invited guests at the meeting in Denver will be long remembered by those who accepted it. It is gratifying to know that after all bills, including the subscription of $2000 to the Rush Monument Fund, had been paid by the local committee of arrangements, something over $4000 remained in the hands of the committee and was returned *pro rata* to the subscribers to the entertainment.

Yellow Fever in Mississippi.—Surgeon Carter of the Marine Hospital Service has reported that the total number of yellow-fever cases which have appeared at Orwood, Miss., is thirty-five but as yet there has been no death. The disease has been traced from Orwood to Taylor, a small town in northern Mississippi, where five cases were reported on July 20th. Two of the persons affected afterward moved to Orwood and from this the disease is believed to have been propagated. The disease is mild in type and no fears are entertained that it will become serious in character.

The Sectional Addresses of the British Medical Association.—In commenting upon these addresses the *Medical Press and Circular* says: "We have been rather painfully impressed in more than one of the addresses at Edinburgh by the somewhat carping, lower-motive attributing, not to say sordid, tone that has been struck by their authors. This was not altogether wanting in that portion of the 'Address on Surgery,' called by the author the moral aspect of the art, or rather of its practice. It was repeated by Dr. Joseph Bell in the children's section, and especially by Dr. McBride, who occupied the chair in the section of laryngology and otology."

The Source of Typhoid Fever at Camp Black.—Colonel Byrne recently appointed to investigate the source of typhoid fever at Camp Black reports that nearly all the typhoid cases there are among the members of the 201st Regiment. The water-supply of this regiment is good; the drainage system of the camp excellent. The source of typhoid infection was obscure until Colonel Byrne discovered that the men had been in the habit of bringing water in pails from a farm well at some distance from the camp, because it was cooler and more palatable than that from the camp hydrants. This well was found to be within twelve feet of a loosely built vault which received the waste of a supposed typhoid-fever patient.

The Return of the Porto-Rican Army.—The transports "Chester" and "Obdam" arrived at New York last week from Porto Rico bearing members of the First Army Corps who were returning home from the Porto-Rican campaign. The "Chester" brought 60 officers and civilians and 1150 men, making a total of 1210. The "Obdam" brought Major-General Miles and his staff, and about 1000 men. All on board were well. On board the "Chester" there was one death during the voyage, that of Captain M. H. Smith, Company K, Fourth Pennsylvania. Six men were in the ship's hospital, five suffering from typhoid fever and the other from malaria. The University of Pennsylvania Hospital sent a special train from Philadelphia to New York to meet the "Chester" and transport immediately to its wards as many of the Pennsylvania Regiment as required hospital care.

Vaccination and the Queen's Speech.—The absence of any reference to the new Vaccination Act in the Speech from the Throne on the closing of Parliament is by no means without its significance. Her Majesty's example in matters affecting the health of her people has always been in the direction of encouraging everything which science and practice have proved to be of real benefit to them, and in no matter has the example been more marked than in the advocacy of vaccination as the real preventive of smallpox. When Parliament was opened the Vaccination Bill was announced by the Queen to the Houses of Parliament and through them to her people. The Bill has passed in a form which causes deep anxiety to a large portion of the more intelligent classes, and in dissolving Parliament no reference is made to it by her Majesty. It is well known that the preparation of the Queen's Speech is no mere matter of form which is delegated to her ministers. Hence the significance of the omission.—*Lancet.*

CORRESPONDENCE.

OUR PHILADELPHIA LETTER.

[From Our Special Correspondent.]

THE HOSPITAL SHIP "RELIEF" — DR. KEEN AS A MEMBER OF THE WAR-INQUIRY COMMISSION — PERSONAL NOTES—HEALTH-BOARD NOTES.

PHILADELPHIA, September 15, 1898.

THE United States hospital ship "Relief" arrived here from Porto Rico last Monday evening having on board 244 sick soldiers. Four who died of typhoid fever on the way were buried at sea, and with this exception all the men stood the voyage remarkably well. An opportunity to inspect the ship was offered as she lay here twenty-four hours, and all who availed themselves of the chance were struck with her cleanliness, and the perfect arrangements which existed for the care of her passengers.

The "Relief" is an entirely new double-deck passenger steamer built at Chester, Pa., in 1896, for passenger traffic between New York and Portland. The decks are divided into four wards—No. 1, occupied by the officers, on the upper deck forward; No. 2, the upper deck, aft; No. 3, the lower deck, forward, and No. 4, the lower deck, aft; these are painted white throughout, with the exception of the floors, which are a chocolate-brown color. On each side of the wards are "double-deck" iron bedsteads, arranged end to end, and extend-

ing the length of the wards, which can accommodate about 250 men comfortably.

Throughout the entire ship the effects of perfect sanitation and good nursing were apparent in the splendid condition of the men and their contentment and enthusiasm for doctors and nurses; "hospital odor" was conspicuous by its absence, a fact largely commented on by veteran army men and it was indeed hard to realize that the "Relief" was a hospital ship so clean and sweet was she from stem to stern.

The hospital staff consisted of Major George H. Torney, U. S. A., who was in command; Major Alfred E. Bradley, U. S. A.; Major Francis Metcalf, U. S. V., and Acting Assistant-Surgeons John Howland, Ernest Schultz, Clarence McWilliams, and Charles E. Morrow. There were three hospital stewards, twenty privates of the hospital corps, ten men, graduate Bellevue nurses, and ten trained women nurses from New York and Philadelphia hospitals, and four acting hospital stewards.

Director Riter and Dr. Hughes met the "Relief" at the pier with ambulances, police patrol wagons, and delivery wagons fitted up with cots, the sick being assigned as follows: Pennsylvania Hospital, 84; Jefferson Hospital, 38; Polyclinic Hospital, 25; Medico-Chirurgical and Presbyterian, 24 each, and the University Hospital, 21.

Great pleasure is felt in Philadelphia that the President should have invited Dr. W. W. Keen to be the medical man of the War-Inquiry Commission. Dr. Keen, though an undergraduate, acted as Assistant Surgeon with the late Dr. Samuel Gross during the Civil War at the Army Hospital, then stationed near the site of the present Philadelphia Hospital, obtaining his diploma at the close of the war. Whether Dr. Keen's duties as Professor of Surgery at Jefferson Medical College and his own practice will prevent his acceptance or not it is impossible to say, but he seems to be an ideal man for the place.

Dr. John Ashhurst, who earlier in the summer was seriously ill at his summer place in Overbrook, is now convalescent.

Dr. Howard F. Hansell has returned from a tour of Canada and Dr. Francis X. Dercum from a tour of Europe.

Dr. Daniel E. Hughes, chief resident physician of the Philadelphia Hospital, has been appointed Acting Assistant-Surgeon, U. S. A., with instructions to look after and arrange for the distribution of returning sick soldiers to the various city hospitals.

Major Edward Martin, Surgeon, U. S. V., returned with the Third Regiment this week.

Henry Trimble, Professor of Analytic Chemistry in the Philadelphia College of Pharmacy and editor-in-chief of the *American Journal of Pharmacy*, died August 24th. Another death of last month was that of Dr. Richard Holmes Townsend, one of the oldest physicians in Philadelphia. He was born in 1817 and after graduating from Jefferson Medical College began practising here, retiring about twenty years ago.

Dr. Henry C. Boenning, State Quarantine Physician, has written Governor Hastings suggesting that, as many sick soldiers will return to this city by water, as many be received at the quarantine station at Marcus' Hook as can be accommodated.

The Board of Health has sent copies of the following resolution to all the hospitals of this city:

Resolved, that the managers of the hospitals in Philadelphia be requested to exercise care in the disinfection of the clothing of patients suffering from infectious diseases, especially cases coming from the soldier camps, and that they be notified that the use of a disinfecting-plant is at their disposal.

OUR FOREIGN LETTER.

[From Our Special Correspondent.]

A RECENT IMPORTANT LEGAL DECISION AS TO EXPERT EVIDENCE—SOME PHASES OF MEDIEVAL MEDICAL PREJUDICE AMONG THE COMMON PEOPLE—A PROTEST AGAINST GERMAN INTERFERENCE WITH THE POSEN CZECHISH MEDICAL CONGRESS—PROFESSOR VON ROSTHORN RESIGNS AT PRAGUE—INTEREST IN ARTIFICIAL ALBUMOSES AND CLINICAL VIEWS AS TO EGG-ALBUMEN.

BERLIN, September 5, 1898.

A RECENT decision of the German Reichsgericht (court of last resort), at Leipzig, in the matter of expert medical testimony seems of special interest to medical men generally. It settles an extremely knotty question, in which doctors have usually been imposed upon while in the witness stand, and for which, so far, they have had no redress. The doctor who wins his suit had been summoned as an ordinary witness and was offered the ordinary fees for such services, which are, of course, extremely small. During the course of his examination under oath, however, he had been asked some questions that had brought out not only his knowledge of the facts of the case, but his medical opinion as to certain of these facts. He answered the questions, but refused to accept ordinary witness fees as a compensation, and sued for medical-expert fees, the amounts of which are definitely settled by German law. The defense was that he had been summoned as an ordinary witness and sworn as such, and that consequently and according to immemorial usage he was entitled only to ordinary witness fees. The lower courts, I believe, decided against him, but the Imperial Court viewed the question from a higher plane of equity than the commonplace of usage, and decided that a medical opinion given by a doctor under oath is expert evidence, and must be paid for as such, even though the doctor has been summoned and sworn as an ordinary witness.

So far it has been the custom to say that the doctor must himself guard against answering questions that included the expression of his medical opinion on the facts in such cases. But this has been manifestly unfair. It throws the burden of maintaining his rights on the witness at a moment when, perhaps, all his presence of mind is required to keep his facts from being twisted into perverse significance by an acute lawyer thoroughly accustomed to cross-examination. Besides, even after the most careful protesting as to the answering of certain direct questions expressive of medical opinion, a sharp cross-examiner is often able to so manage the recital of the

facts and their connections and relations that an inference of medico-legal value quite sufficient to be of use in influencing the jury is secured.

This new decision relieves the doctor of all further need for watchfulness in the matter. He simply answers all questions put to him to the best of his knowledge. If in the opinion of the court his answers include the expression of medical opinion, then his evidence must be paid for as expert medical evidence. Let us hope for some such thoroughly simple and satisfactory and] eminently just settlement of the question in America.

Some time ago, in a small town in the Low Countries, there was reported by the newspapers a case of witchbaiting that was thoroughly traditional in its way, and showed that the old spirit is not all dead yet. Two young people in a family had died of consumption. They had reached manhood seemingly in perfect health, and then one after the other had sickened, pined away, and died. A third, a sister was spared for a year or two longer, and then she, too, began to decline. The villagers finally accused an old woman of the village who lived alone on its confines, and who was supposed to have some reason for having a grudge against the family, of having bewitched them, and being the cause of their deaths. They threatened her with all manner of dire evil unless she should raise the blighting charm she was supposed to have fastened upon her victim. Naturally threats availed nothing. Finally, she was dragged before her supposed victim by the villagers, and when she refused to comply with their request to relieve the patient was seriously maltreated. She had to be rescued from her precarious position by the authorities and placed where she could be properly protected.

An analogous story, but still more medieval in character, and strikingly illustrative of the often fearful sufferings that patients suffering from chronic skin diseases had to undergo from an ignorant populace, comes from Vienna. The victim, a middle-aged man, lies at present in the surgical wards of the General Hospital. In one of the outlying districts in the Bukowina (the Bukowina is an especially backward district of the Austrian Empire east of Hungary) the patient had contracted a chronic eczema, which gradually spread until it affected most of his body. The usual home remedies were tried for it, but were of no avail. Finally, the peasants with whom he was living grew alarmed at the persistence and universality of the disease; they began to fear that it might be contagious. They refused to have anything to do with him any longer, and he was compelled to live alone in an old ruined house. A woman brought him some black bread each day, and on this he lived.

Tired of his seclusion and hardships, one day he ventured to crawl out, but was stoned back by the peasants. Another day he crawled to a farmyard near by to get some vegetables. Fearful of being observed, he crawled into the loft of a barn, from which he was ruthlessly thrown out by the owner. Severe injuries were inflicted by this fall, and a clergyman was brought to him, who supplied him with enough money to get to Vienna. At first it was feared that amputation would be necessary, for some of the hemorrhagic exudates in bruised portions of the limbs had become purulent; it is hoped, however, now that recovery from his sad state will be complete and without mutilation, that he can be sent back to his home entirely well, eczema and all. The poor, unfortunate fellow is overjoyed at the prospect, seems to harbor no ill feelings against his persecutors, and is only anxious to be well again. He had practically given up all hope of ever again associating with his fellow-men, and considered himself hopelessly condemned to the solitary life of a leper. One would scarcely expect incidents so characteristically medieval at the end of the Nineteenth Century, but they occur as examples of what old prejudices were capable of, and some of it lurks in much higher circles than the cases given illustrate.

As the result of the German Government forbidding the attendance of foreigners at the Congress of Slavish Naturalists and Physicians at Posen, the sessions announced for this year are, as I said recently, not to be held. The Polish physicians of Cracow and Lemberg, Austrian subjects, have filed a protest with the Austrian Government in the matter. Austria and Germany are allies, and this forbidding by one State of the visit of subjects of the other for scientific purposes is a serious violation of at least the spirit of the alliance between the two countries. Owing to party differences in the Austrian Parliament the Slavs practically hold the balance of power, so that it is not probable that the protest will be allowed to drop until it has at least found its way into some diplomatic interchange of notes in the matter between the two countries.

As another feature of the strained state of affairs between the Czechs and the Germans at Prague, and the consequent unpleasantness between the two universities, with the gradual decrease in attendance at the German University of Prague, comes the announcement of the resignation of Professor Rosthorn, which took effect at the end of the present semester. It is not known whether he will go to Graz or Utrecht. This is the first resignation from the faculty of the German university because of the political difficulties, though there would seem to have been sufficient reason in certain cases before when Czechish sentiment ran so high that there was actually danger of bodily injury being inflicted. The resignation is stigmatized by German journals as an abandonment of the standard in the presence of the enemy, but it scarcely requires the eye of a prophet to foresee that under the circumstances his example must be followed sooner or later by others if the German University is maintained at Prague. The only hope of a really successful revival of the university lies in its removal into territory more German than Prague, where less than 30,000 of the 200,000 inhabitants are Germans.

In the midst of the interest manifested recently in artificial foods, of which albumen is the principal constituent, the present position of the clinicians with regard to egg-albumen, one of the purest forms of natural albumen easily available for general use is a very interesting commentary on the subject. It has changed somewhat from the traditional medical opinion on the subject, I think. I

heard a distinguished clinician, whose great forte is dietetics, remark not long ago that he would as soon advise a patient with a delicate stomach, an invalid, or a convalescent to take raw meat as to take raw eggs. The primary coagulation of the albumen so easily accomplished by means of heat calls for the expenditure of not a little vital energy. It is often not completely accomplished when digestion is weak, and so albumen passes through the digestive tract absolutely unassimilated or is assimilated in a form in which it is unavailable for tissue metabolism, and is excreted by the kidneys in a form of alimentary albuminuria. He considered, therefore, that the traditional prescription of egg-nog, the eggs merely beaten up raw in milk, for invalids is a mistake.

As to the cooking of eggs, he did not think hard-boiled eggs so difficult of digestion as usually thought. The main difficulty is the penetration into the coagulated albumen of sufficient digestive fluids. This could be readily overcome if the albumen were divided by mastication or during its preparation into sufficiently fine particles. In general the specialists in diseases of the stomach and intestines seem to be agreed that eggs are often unsuitable in disturbances of the digestive tract, though it is so usual to recommend them as a bland, unirritating article of diet. When abnormal fermentation is already going on and diarrhea is present, the nitrogenous portions of the albumen are liable to cause further trouble. When constipation exists, and absorption and evacuation is delayed, higher and lower albumoses than those available for tissue metabolism are formed, and add to the toxemia, for the dividing line between wholesome and toxic albumoses is a very narrow one.

Finally, there are some of the specialists in kidney diseases who seem to be of the opinion that just as alimentary glycosuria may lead to genuine diabetes, so alimentary albuminuria may lead to a vitiated habit of kidney epithelium that allows the passage even of a serum albumen. From this to true degeneration and actual nephritis is but a step which has so far not been clinically observed, but which the well known insidiousness of nephritides might easily have permitted to escape notice so far.

REVIEWS.

A SYSTEM OF PRACTICAL MEDICINE. By American Authors. Edited by ALFRED LEE LOOMIS, M.D., Late Professor of Pathology and Practical Medicine in the New York University, and WILLIAM GILMAN THOMPSON, M.D., Professor of Medicine in the Cornell University Medical College, New York. Volume IV. Philadelphia and New York: Lea Brothers & Company, 1898.

THIS volume completes this system of medicine, auspiciously begun a year ago. Like its predecessors it bears the stamp of American teaching and research and is marked, possibly, by more originality in these respects than the preceding volumes. The subjects are judiciously arranged and overlapping of ideas is thus, to a large extent, avoided.

The volume deals with the diseases of the nervous system and mind, the vasomotor and trophic disorders, osteomalacia, rachitis, rheumatism and its allies, obesity, scurvy, and Addison's disease. Among the contributors are Drs. M. Allen Starr, F. G. Finley, Edward D. Fisher, C. A. Herter, Charles L. Dana, J. T. Eskridge, F. X. Dercum, Charles K. Mills, Wharton Sinkler, and W. Gilman Thompson (whose paper on "Seasickness" is included among functional nervous disorders). The diseases of the mind are discussed by Drs. William B. Pritchard, Willis E. Ford, William Noyes, Landon Carter Gray, Pearce Bailey, and Morton Prince. The diseases of the muscles are treated by Dr. Finley.

Dr. W. Gilman Thompson writes on rheumatism, gonorrheal arthritis, arthritis deformans, gout, lithemia, obesity, and scurvy. Dr. Finley contributes an article on osteomalacia, Dr. A. Jacobi one on rachitis, and Dr. Coleman writes on Addison's disease.

Since the views of most of these gentlemen on the various subjects assigned to them are well known, it has seemed wisest to the reviewer simply to mention the topics without discussing them. A system conceived on the lines of this one best achieves its purpose through a careful selection of authors and little editing. This system is a series of monographs by able teachers and writers on American medicine, is modern in every sense of that ill-used word, is broad and comprehensive, and represents most completely the present status of medicine in the United States. It is one of the few books of which a reviewer can honestly say that "it should be in every physician's library and in the hand of every medical student."

HANDBOOK FOR THE HOSPITAL CORPS OF THE UNITED STATES ARMY AND STATE MILITARY FORCES. BY CHARLES SMART, M.D., Deputy Surgeon-General, United States Army. New York: William Wood & Co., 1898.

THIS short but complete treatise, comprising as it does the general management of post and field-hospitals, sanitary care of camps, the essentials of anatomy and physiology, as well as a more detailed course of instruction in special duties in emergencies of military medicine, bears the stamp of approval of the Surgeon-General of the Army. As a text-book it will materially assist those members of the corps who wish to raise their qualifications to the higher standard required of them than of the detailed men previously on duty with the Medical Department. The duties of stewards and acting-stewards, varied as they are, require thorough familiarity with military discipline and drill, nursing, first-aid, cooking, pharmacy, clerical work, field work, and the care and management of animals. These duties are, under the direction of the surgeon, to look after and distribute hospital stores and supplies, to care for the hospital property, to compound and administer medicines, to supervise the preparation and serving of food, to maintain discipline in the hospital and watch over its general police, to prepare the hospital reports and returns, to supervise the duties of the hospital corps in hospital and in the field, and to per-

form such other duties connected with their positions as may, by proper authority, be required of them. While the special instruction of the order lies in these matters, and the higher education of the studies must be directed by the surgeon, the volume under review may well supplement this practical training. Besides those mentioned, the subjects of the sanitary care of camps, construction, drainage, water-supply, and ventilation of wards, and executive duties are discussed. There are well-illustrated chapters on fractures and dislocations, asphyxiation, poisoning, hemorrhage, and insensibility, with some concluding remarks on the elements of cookery.

HAY-FEVER AND ITS SUCCESSFUL TREATMENT. By W. C. HOLLOPETER, A.M., M.D., Clinical Professor of Pediatrics in the Medico-Chirurgical College of Philadelphia; Physician to the Methodist-Episcopal Hospital. Philadelphia: P. Blakiston's Son & Co., 1898.

THE nature of the "periodic influenzas" and the rationale of their successful treatment have been the subjects of unnumbered treatises, and so-called specifics have been as numerous as the theories of causation. The short treatise under consideration embodies the suggestions of a practitioner who claims remarkable and uniform success with a simple therapeutic procedure; this consists in thorough scrubbing of the entire nasal mucous membrane with an alkalin solution (Dobell's), and the subsequent application of a mild solution of menthol in alboiene. This rigidly simple form of treatment is said to have given relief to over 200 patients. Undoubtedly the author is to be congratulated upon such results, no less than upon the interesting chapters on the history of hay-fever under its multitudinous *noms de guerre*, and those on etiology and the theories of its pathogenesis. The thorough clinical study of this affection and the exhaustive review of the literature related to it, in a brief and succinct form, give us the essentials of the subject most attractively.

As much can not, unfortunately, be said for such paragraphs as the following: "Some years ago, in the dispensary, I made a somewhat prolonged study of the nasal secretion of young children waiting for treatment for various simple disorders, and it was found that, although a child might have no constitutional indication of the disease whatever, often the bacteria of diphtheria, *scarlet fever*, *measles*, *whooping-cough*, or tuberculosis were present in the nasal secretions."

Details of the "prolonged bacteriological study" by which specific micro-organisms of such importance were identified and isolated, will be impatiently awaited by pathologists, who will, undoubtedly, give a warm welcome to "bacillus scarlatinæ" (Hollopeter) and to "micrococcus putationis (Hollopeter) of measles."

ELECTRICITY IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE NOSE, THROAT, AND EAR. With 161 Illustrations. By W. SCHEPPEGRELL, A.M., M.D., ex-Vice-President American Laryngological, Rhinological, and Otological Society; Member American Academy of Medicine, etc. New York: G. P. Putnam's Sons, 1898.

THIS is a most complete and able presentation of the entire subject of electrotherapeutics in rhinology, laryngology, and otology by an author of acknowledged standing, whose rich personal experience is here supplemented by a thorough review of the literature. The result of this systematic management of the material is to present, not only clear and succinct theoretical considerations, but simple, though complete, practical methods which must form a valuable aid to the student or practitioner in the application of electricity in these branches of medicine, as well as a convenient and useful book of reference for the busy specialist.

Among the most valuable chapters are those on the general principles of electrophysics and electrophysiology, definition of units of measurement and modes of action, generation of current, arrangement of cells and induced currents. The subject of examination with electric light of the accessory sinuses (transillumination) is treated with special thoroughness. The scope of the work may, perhaps, be best indicated by a simple citation of a number of important subdivisions: electrocautery, electrolysis, cataphoresis, electromagnetic appliances, microphone, massage in ololaryngology, intranasal vibrators, pneumomassage of ear, and a complete study of the use of the X-rays.

AN AMERICAN TEXT-BOOK OF GENITO-URINARY DISEASES AND DISEASES OF THE SKIN. Edited by L. BOLTON BANGS, M.D., Consulting Surgeon to St. Luke's Hospital; Visiting Genito-Urinary Surgeon to St. Mark's Hospital, New York, and W. A. HARDAWAY, A.M., M.D., Professor of Diseases of the Skin and Syphilis, Missouri Medical College, St. Louis. Illustrated. Philadelphia: W. B. Saunders, 1898.

THIS volume, of ponderous size, is uniform with the other "American text-books" issued by the same publisher. There are forty-seven contributors, most of whose names are familiar as specialists in one or the other of the two departments of medicine with which the book deals. The work, as a whole, shows evidence of careful editing, and may be put down as a very excellent *résumé* of the subjects treated. Here and there a few grammatical errors assert themselves, and there is a certain unevenness which is readily accounted for by the large number of writers.

Without wishing to discriminate, we point out the excellence of the articles on "Diseases of the Male Urethra" (Dr. Lydston), "Diseases of the Prostate" (Drs. White and Wood), "Diseases of the Ureter" (Dr. Fenger), and "Hereditary Syphilis" (Dr. Jacobi). The original pathologic work of Dr. Pollitzer on the xanthomata, which he finds to contain degenerated muscle-fibers, is significant. Dr. Tuholske's discussion of the tropical skin diseases is excellently done. It is almost impossible to go further into this huge work without taking up too much space. The book represents accepted teachings, and will undoubtedly meet the kindly fate it deserves. It is splendidly illustrated with engravings and colored plates, and is well printed on good paper. We could almost wish that the publisher had issued it in two volumes.

TRANSACTIONS OF THE AMERICAN PEDIATRIC SOCIETY. Ninth session, held in Washington, D. C., May 4, 5, and 6, 1897. Edited by FLOYD M. CRANDALL, M.D. Vol. IX. Reprinted from the *Archives of Pediatrics*, 1897.

THIS number of the transactions contains so many valuable articles that but brief reference can be made to some of them here. Of special interest is a paper by Adams on the "Evolution of Pediatric Literature in the United States." There are two contributions from the pen of the late O'Dwyer, one on "Congenital Stenosis of the Larynx," and one on "Retained Intubation Tubes." Both are very timely. Koplik gives a short account of the method he uses for the rapid bacteriological diagnosis of diphtheria, a method which is certainly deserving of further trials. Jacobi describes a very rare case of sarcoma of the cutis of the newly born, with a full bibliography. Huber details a case of goiter cured by thyroid extract, and Kerley reports a cure by the same remedy in a case of exophthalmic goiter. The volume closes with a study of abscess of the brain by Holt.

INFLAMMATION OF THE BLADDER AND URINARY FEVER. By C. MANSELL MOULIN, M.D. (Oxon), F.R.C.S., Surgeon and Lecturer on Surgery at the London Hospital. Philadelphia: Blakiston, Son & Co., 1898.

THIS is a brochure based largely on clinical observations, supporting the laboratory experiences of Rovsing and Melchior that the mere introduction of pus-producing organisms into a healthy bladder does not suffice to produce cystitis. The bacillus coli communis was found to be the cause of most of the cystitis. The author is skeptical as to gonorrheal cystitis being caused sorely by the gonococcus; he regards it as a mixed infection. Mr. Moulin holds that more frequently the infection in tuberculous cystitis is by way of the lymphatics descending along the ureter and not secondary to a descending ureteritis infected from a diseased kidney. With propriety the author emphasizes the disadvantage of the Trendelenburg position when operating on old men afflicted with emphysema.

SKIN DISEASES OF CHILDREN. By GEORGE HENRY FOX, A.M., M.D., Clinical Professor of Diseases of the Skin, Columbia University, New York. New York: William Wood & Co., 1897.

THIS work is a reproduction, with some additions, of a series of articles on skin diseases that have already been published in the *American Journal of Obstetrics*. It is difficult to understand what purpose a book of this character can subserve. While there are diseases of the skin that are more common in childhood than in adult life, there are virtually none that are wholly peculiar to this age. On the other hand, the small scale on which the profuse illustrations are carried out, renders them almost useless for diagnostic purposes. The character of the text may be judged from the fact that the entire subject of lupus and the tuberculides is treated in ninety-five lines of type.

THERAPEUTIC HINTS.

For Mucous Patches.—KIRSTEIN has found a five-per-cent. solution of corrosive sublimate very efficacious for swabbing syphilitic patches of the mouth and pharynx, causing their disappearance more rapidly than any of the drugs commonly employed for the purpose.

Treatment of Enteroptosis in Children.—In order to overcome the constipation accompanying this condition, BOAS replaces the purgative or alkaline mineral waters generally prescribed, and which he has found harmful, by enemata and by drugs which tend to disinfect and stimulate the intestines. Of the following formulæ he gives preference to that containing resorcin:

1. ℞ Bismuthi salicylat. . . gr. v
   Ext. nucis vomicæ . . gr. ½–gr. i.
   M. Ft. chart No. XX. Sig. One powder three times a day after eating.

2. ℞ Resorcin . . . . gr. xxx
   Ext. nucis vomicæ . . . gr. iiiss
   Aq. chloroformi . . . ℥ iv
   Aq. menthæ pip. . . . ℥ i.
   M. Sig. Two teaspoonfuls three times a day after eating.

3. ℞ Bismuthi salicylat. } aa . . gr. lxxv.
   Beta-naphthol }
   M. Ft. chart No. XXX. Sig. One powder three times a day after eating.

Formula for Quinin in Solution.—The prescribed dose of the following mixture is added to a wineglass of water in which five grains of bicarbonate of soda have been dissolved, and is drank during effervescence. The taste of the medicine thus given is not unpleasant, and it is well borne by the stomach:

℞ Quininæ sulphat. . . . . ʒ i
Ac. citrici . . . . . ʒ iiss
Syr. cort. aurantii } aa . . . gr. xv
Syr. simplicis }
Aq. dest. . . . q.s.ad ʒ v.
M. Sig. Ten drops to be given as directed.

Administration of Antipyrin and Salicylate of Soda.—BRICEMORET discourages the administration of these drugs in capsules, since in concentrated form they often cause gastric pain and irritation. Antipyrin may be given advantageously in a glass of Vichy or seltzer, with or without the addition of a little citric acid.

Salicylate of soda should be dissolved in at least twenty times its weight of water. Bricemoret prescribes 90 grains of the drug to a mixture of 2½ ounces, each of water and syrup of sweet orange peel, and 1 ounce of curaçoa. Each dose of this mixture is given in half a glass of effervescent water.

Ointment for Psoriasis.—

℞ Ichthyol }
Ac. salicylici } aa . . . gr. xlv
Ac. pyrogallici }
Ol. olivæ } aa . . . . ʒ iiss.
Lanolini }
M. Ft. ungt. Sig. External use.—*Richter.*